

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

## **ECUADOR**

### **METROPOLITAN QUITO ENVIRONMENTAL SANITATION PROGRAM (PHASE I)**

**(EC-0200)**

#### **LOAN PROPOSAL**

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## ABBREVIATIONS

AME	Asociación de Municipalidades del Ecuador [Association of Municipalities of Ecuador]
CONAM	Consejo de Modernización del Estado [State Modernization Council]
EBIT	earnings before interest and taxes
EBITDA	earnings before interest, taxes, depreciation and amortization
ECAPAG	Empresa Cantonal de Agua Potable y Alcantarillado de Guayaquil [Water and Sewer Company of Guayaquil]
EMAAP-Q	Empresa Metropolitana de Alcantarillado y Agua Potable de Quito [Metropolitan Quito Sewer and Water Company]
EMASEO	Empresa Metropolitana de Aseo [Metropolitan Garbage Collection Company]
EPs	Eastern parishes
IEOS	Instituto Ecuatoriano de Obras Sanitarias [Ecuadoran Sanitary Works Authority]
IRER	internal rate of economic return
MDMQ	Municipio Distrito Metropolitano de Quito [Metropolitan Quito Municipal District]
MIDUVI	Ministerio de Desarrollo Urbano y Vivienda [Ministry of Urban Development and Housing]
O&M	operation and maintenance
PEU	program executing unit
SELBEN	Sistema de Identificación de Usuarios de Bajos Ingresos [low-income user identification system]
WTP	willingness to pay



## ECUADOR

### IDB LOANS

APPROVED AS OF JULY 31, 2002

	<i>US\$Thousand</i>	<i>Percent</i>
<b>TOTAL APPROVED</b>	<b>3,707,754</b>	
DISBURSED	3,485,229	94.0%
UNDISBURSED BALANCE	222,525	6.0%
CANCELLATIONS	531,643	14.3%
PRINCIPAL COLLECTED	1,506,898	40.6%
<b>APPROVED BY FUND</b>		
ORDINARY CAPITAL	2,687,369	72.5%
FUND FOR SPECIAL OPERATIONS	933,070	25.2%
OTHER FUNDS	87,315	2.4%
<b>OUTSTANDING DEBT BALANCE</b>	<b>1,978,331</b>	
ORDINARY CAPITAL	1,363,683	68.9%
FUND FOR SPECIAL OPERATIONS	606,531	30.7%
OTHER FUNDS	8,117	0.4%
<b>APPROVED BY SECTOR</b>		
AGRICULTURE AND FISHERY	1,074,603	29.0%
INDUSTRY, TOURISM, SCIENCE TECHNOLOGY	444,765	12.0%
ENERGY	316,244	8.5%
TRANSPORTATION AND COMMUNICATIONS	314,972	8.5%
EDUCATION	208,708	5.6%
HEALTH AND SANITATION	365,431	9.9%
ENVIRONMENT	45,968	1.2%
URBAN DEVELOPMENT	235,022	6.3%
SOCIAL INVESTMENT AND MICROENTERPRISE	296,081	8.0%
REFORM PUBLIC SECTOR MODERNIZATION	376,038	10.1%
EXPORT FINANCING	0	0.0%
PREINVESTMENT AND OTHER	29,922	0.8%

\* Net of cancellations with monetary adjustments and export financing loan collections



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## STATUS OF LOANS IN EXECUTION AS OF JULY 31, 2002

(Amounts in US\$ thousands)

APPROVAL PERIOD	NUMBER OF PROJECTS	AMOUNT APPROVED	AMOUNT DISBURSED	% DISBURSED
Before 1996	5	219,453	213,387	97.24%
1996 - 1997	8	253,600	199,891	78.82%
1998 - 1999	3	104,500	56,465	54.03%
2000 - 2001	8	101,520	13,771	13.57%
2002	1	25,000	0	0.00%
<b>TOTAL</b>	<b>25</b>	<b>\$704,073</b>	<b>\$483,514</b>	<b>68.67%</b>

\* Net of Cancellations . Excluding export financing loans.



**Inter-American Development Bank**  
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Operational Information Unit

## Ecuador

### Tentative Lending Program

#### 2002

Project Number	Project Name	IDB US\$ Millions	Status
EC0207	Housing Sector Support Program II	25.0	APPROVED
EC0201	Sustainable Develop. Northern Amazon Region	10.0	
EC0200	Environmental Sanitation of Quito Metropolitan District	40.0	
EC0213	Deepening Rural Financial Services	3.5	
<b>Total - A : 4 Projects</b>		<b>78.5</b>	
EC0101	Strengthening of the Seguro Social Campesino	5.0	
<b>Total - B : 1 Projects</b>		<b>5.0</b>	
<b>TOTAL 2002 : 5 Projects</b>		<b>83.5</b>	

#### 2003

Project Number	Project Name	IDB US\$ Millions	Status
EC0132	National Road Rehabilitation Program I	35.0	
EC0199	Citizenship Security National Townships	10.0	
EC0139	Municipal Development II (PDM II)	40.0	
EC0205	Innovation and Technological Development Program	20.0	
EC0193	Coastal Resource Management Program II	13.0	
EC0211	Rural Transport Infrastructure Program II	20.0	
EC0185	Porte Medio Urban Transport	15.0	
EC0210	Institutional Strengthening of the Ministerio de Obras Publicas	2.0	
<b>Total - A : 8 Projects</b>		<b>155.0</b>	
*EC0214	Pichincha Bank	18.0	
<b>Total - B : 1 Projects</b>		<b>18.0</b>	
<b>TOTAL - 2003 : 9 Projects</b>		<b>173.0</b>	
<b>Total Private Sector 2002 - 2003</b>		<b>18.0</b>	
<b>Total Regular Program 2002 - 2003</b>		<b>238.5</b>	

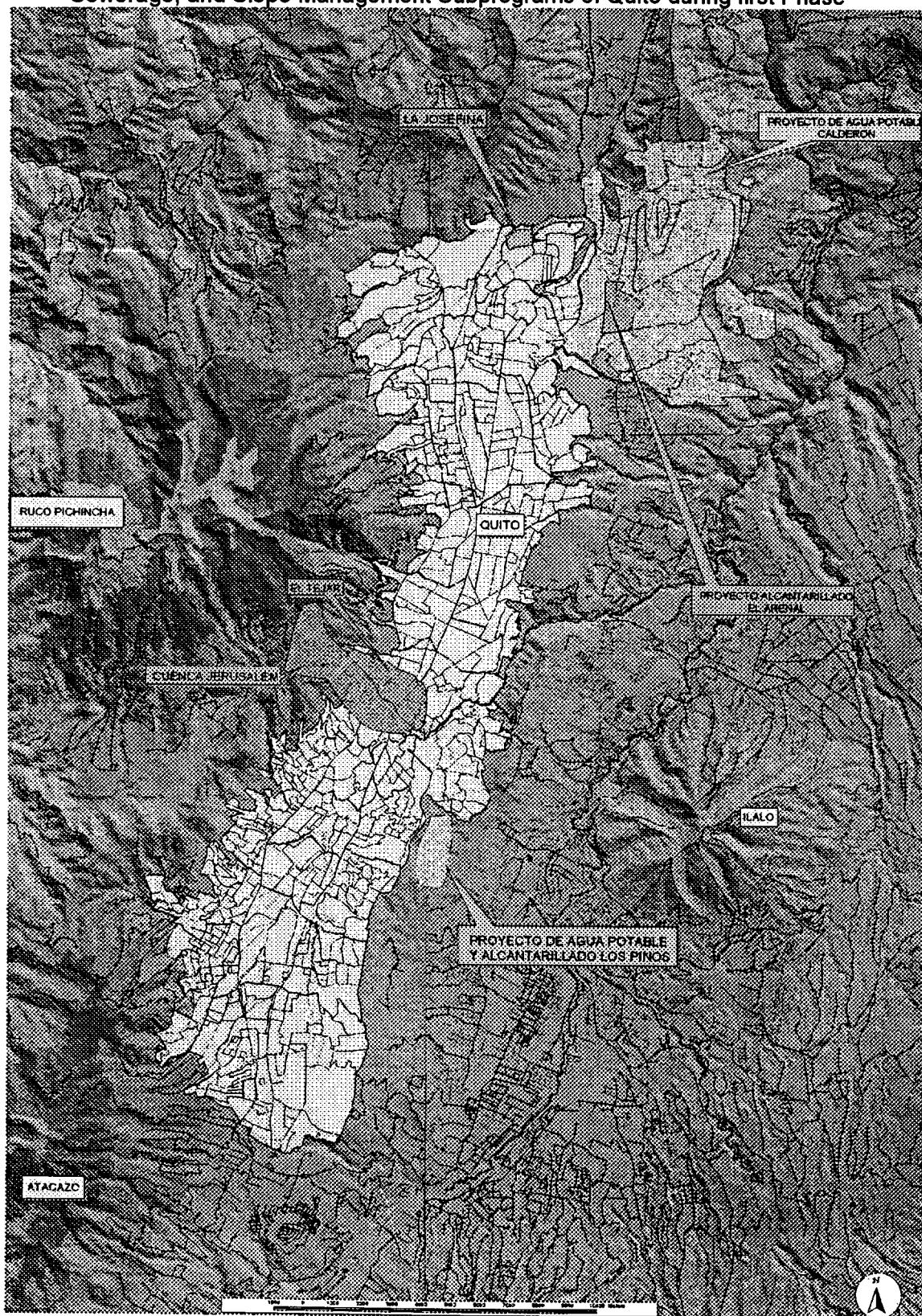
\* Private Sector Project



# ECUADOR

## ENVIRONMENTAL SANITATION PROGRAM FOR THE METROPOLITAN DISTRICT OF QUITO (EC-0200)

Areas of influence in Potable Water,  
Sewerage, and Slope Management Subprograms of Quito during first Phase



This map, prepared by the Inter-American Development Bank, has not been approved by any competent authority and its inclusion in the loan document has the exclusive objective of indicating the area of influence of the project proposed for financing.

**METROPOLITAN QUITO ENVIRONMENTAL SANITATION PROGRAM**  
**(PHASE I)**  
**(EC-0200)**

**EXECUTIVE SUMMARY**

<b>Borrower:</b>	Empresa Metropolitana de Alcantarillado y Agua Potable de Quito (EMAAP-Q) [Metropolitan Quito Sewer and Water Company]		
<b>Guarantor:</b>	Republic of Ecuador and Municipio del Distrito Metropolitano de Quito (MDMQ) [Metropolitan Quito Municipal District]		
<b>Executing agency:</b>	Empresa Metropolitana de Alcantarillado y Agua Potable de Quito (EMAAP-Q)		
<b>Amount and source:</b>		<b>Stage One</b>	<b>Stage Two</b>
	IDB (OC):	US\$40 million	US\$54 million
	Local:	<u>US\$10 million</u>	<u>US\$ 6 million</u>
	Total:	US\$50 million	US\$60 million
<b>Financial terms and conditions:</b>	Amortization period:	25 years	
	Grace period:	4 years	
	Disbursement period:	4 years	
	Interest rate:	variable	
	Inspection and supervision:	1%	
	Credit fee:	0.75%	
	Currency:	United States dollar from the Single Currency Facility	
<b>Objectives:</b>	The objectives of the program are to reduce flooding, mudslides and landslides, to expand water and sewer services in MDMQ priority areas, and to build institutional capacity for efficient management of EMAAP-Q water and sewer services.		
<b>Description:</b>	The operation will have three components in stage I.		
	<b>1. Component I. Slope management and flood control (US\$15 million):</b> Control of floods, landslides, and mudslides requires a series of actions to complement the physical works concerned with land use planning in affected areas, management of ecologically fragile zones, and resettlement of families living in risk areas. This component is divided into four subcomponents:		

- a. **Works for water regulation, slope stabilization, and the repair and expansion of sewers (US\$11 million):** Includes labor, materials, and equipment for civil works, the procurement and installation of pipes and electromechanical equipment that forms part of the slope management and flood control system, and the costs of community development, conservation of green areas, and the creation of microenterprises to collect trash.
  - b. **Management and conservation of urban and rural green areas (US\$1.5 million):** This subcomponent would include funding for the construction and conservation of green areas in slope management intervention zones.
  - c. **Community development (US\$500,000):** This subcomponent would include the establishment of community microenterprises for trash collection and community education for citizen participation.
  - d. **Family resettlement (US\$2 million):** Families living in areas at risk of events caused by extreme rainfall and families whose housing interferes with the construction of program works will be resettled.
2. **Component II. Potable water and sewer works (US\$21.03 million):** Expansion of water systems in priority areas. Construction of trunk sewers, intercepting sewers, discharge works and branch lines for the existing sewer system in neighborhoods and parishes that already have potable water services. This component has two subcomponents.
    - a. **Water works (US\$14.53 million):** Includes labor, materials, and equipment for civil works and the procurement and installation of pipes and electromechanical equipment to expand the water system – water conveyance, distribution lines, and residential connections.
    - b. **Sewer works (US\$6.5 million):** Includes pipe procurement and labor, materials and equipment for transport, placement and testing of pipes used to expand sewer services, including civil works, inspection chambers, etc.
3. **Component III. Institutional strengthening (US\$1.6 million):** This component has three subcomponents.
    - a. **Private-sector participation (US\$500,000):** The estimate includes consulting services to privatize part of EMAAP-Q's commercial management and to optimize the part that the

company will retain. Any studies that are needed on participation by the private sector in the Eastern Parishes (EPs) will be funded from the contingency resources budget line.

- b. **Institutional strengthening of the municipality (US\$300,000):** Financing will be provided for strengthening municipal capacity to implement in a pilot area the general plan for land development in the MDMQ, which regulates land use.
- c. **Institutional strengthening of EMAAP-Q (US\$800,000):** Involves works and actions to reduce the cost of providing water and sewer services, such as the program to control unbilled water and the expansion of the hydrometeorological monitoring system. Also included are studies on establishing a fund for direct subsidies to low-income customers and on updating the costs of the services.

**The role of the project in the Bank's country and sector strategy:**

By supporting the control and protection of vulnerable zones in Quito, the program will address one of the city's most critical socioenvironmental problems, which puts human lives at risk and affects growth and the quality of life in important parts of the city. The program follows the recommendations of the Bank's natural disaster prevention strategy, which gives priority to measures to reduce vulnerability, and proposes to finance disaster prevention and mitigation and strengthen risk management capacity.

Improvements in public utilities are one way of reducing poverty levels and improving health indexes. The proposed operation fits into this strategy, since it improves water and sewer service in Quito, by expanding systems, particularly sewers, into areas not presently served. The project will contribute to the efficiency and sustainability of water and sewer services by including the private sector in the management of the EMAAP-Q.

**Environmental and social review:**

On 3 August 2001, the Committee on Environment and Social Impact/Technical Review Group (CESI/TRG) studied profile II and requested a local environmental assessment. All of its recommendations have been incorporated into the project.

**Positive impacts:** The program will have a favorable effect on the environment and the quality of life: (i) control of landslides, flooding, and mudflows and protection of the infrastructure in parts of the historical center of Quito; (ii) erosion control in ravines; (iii) terracing and reforestation in illegal landfills; (iv) elimination of discharges and dumping of trash into ravines; (v) involvement of the public in management and mitigation of the risk of landslides and flooding; (vi) support for the creation of microenterprises to collect trash in the

ravines; (vii) in the final stage, delivery of water service to about 200,000 people and sewer service to 74,000 people; (viii) support for citizens through the establishment of a network of community organizations; and (ix) resettlement of 54 families living in risk areas.

**Negative impacts:** Most of the operation's adverse effects will occur during construction and maintenance of the works. These effects will be temporary, localized, and easy to control. The program has environmental and social technical specifications to mitigate its adverse effects that will be included in the bidding documents and construction contracts. A preliminary resettlement plan has been prepared in accordance with Bank policy (OP-710) to organize the program's social components. An environmental management plan has been drawn up, setting forth activities, execution responsibilities, costs and a monitoring plan.

**Benefits:**

The program is intended to reduce the risks of flooding and mudslides caused by torrential rainfall in the central and southern parts of the city, with its benefits accruing to individuals in these areas, particularly people, mainly from low-income groups, living in areas at risk.

The program will also extend the coverage of water and sewer services to people in Quito who currently do not have them, thus improving the quality of life of these people who are mainly in the low-income population.

**Risks:**

**Risk:** There is a risk that basing the rates charged by EMAAP-Q for water and sewer services on long-term marginal costs will make it difficult to implement the system for political reasons. **Mitigating measure:** This risk is minimized by the study to set those costs on the basis of technical criteria, the establishment of a subsidy fund, and the incentive of a second stage of the program, which will not be considered by the Bank unless the rate system is implemented and operational.

**Risk:** Another probable risk is that there may be no interest on the part of the private sector in taking part in the bidding on water and sewer services in the EPs or in the management of commercial operations. **Mitigating measure:** The company will be required to reexamine its long-term investment strategy.

**Risk:** It may not be possible to implement a national regulatory framework in the short term because of the hostility of municipalities to the central government as a result of decentralization and autonomy. **Mitigating measure:** To mitigate this risk, it has been agreed that a provisional municipal regulatory scheme will be created, using management and rate audits.

**Special contractual conditions:****1. Conditions precedent to the first disbursement:**

(i) Establishment and start up of the Program Executing Unit (PEU) as an office of the general management (paragraph 3.1) and of the Private-Sector Participation Unit (paragraph 3.7); (ii) placing the program's Operating Regulations in effect (paragraph 3.3); and (iii) signature of the agreement with the MDMQ for the transfer of funds and repayment of part of the loan (paragraph 4.2).

**2. Conditions during execution. The executing agency shall include the following activities in the annual work plan (AWP) to be presented each year:**

**In the first six months:** (i) contracting of the firm in charge of the information campaign on private-sector participation (paragraph 3.7); and (ii) commissioning of the studies on costs, rates, and the subsidy fund (paragraphs 3.11).

**In year one:** (i) commissioning of studies to determine the company's fixed assets (paragraph 4.15); and (ii) commissioning and completion of the studies on EMAAP-Q's commercial management (paragraph 3.9).

**In year two:** (i) contracting of private management for about 50 percent of the commercial area (paragraph 3.8); and (ii) contracting of an investment bank for participation by the private sector in the EP (paragraph 3.8).

**In year three:** (i) call for tenders for the EP private-sector participation (paragraph 3.8); (ii) establishment of the subsidy fund for low-income customers (paragraph 3.12); and (iii) modification of the rate structure (paragraph 5.31).

**3. Mid-term review**

A mid-term review of phase one, to be performed by 30 April 2005, will examine compliance with the performance indicators each year (2003 and 2004) and the general progress of program execution. Commitments over and above 60 percent of the total direct costs of the works will only be authorized if those indicators have been complied with by the end of year two (2004) (paragraph 3.33).

#### 4. Other conditions

(i) Additional prerequisites for the call for bids and start up of the works (paragraph 3.20); (ii) operating and maintenance obligations (paragraph 3.26); (iii) management and rate audits (paragraph 3.36); (iv) financial audits (paragraph 4.6); (v) maintenance of a debt coverage ratio (paragraph 5.43); (vi) rates (paragraph 5.42); and (vii) presentation of information for the evaluation of the program's efficiency and effectiveness (paragraph 3.35).

**Poverty-targeting and social sector classification:**

This operation qualifies as a social-equity enhancing project, as described in the indicative targets mandated by the Bank's Eighth Replenishment (document AB-1704). Furthermore, this operation qualifies as a poverty-targeted investment (PTI) (see paragraph 5.34). The borrowing country will not be using the 10 percentage points in additional financing.

**Exceptions to Bank policy:**

None.

**Procurement:**

EMAAP-Q will be responsible for the procurement of goods and related services and the contracting of works in accordance with the Bank's standards and procedures as stipulated in Annex B to the loan contract. International competitive bidding will be required for procurement of goods valued at US\$250,000 or more and works valued at US\$3 million or more. Consulting services will be engaged in accordance with Annex C to the loan contract, with international competitive bidding being used for contracts over US\$200,000. Bids below these thresholds will follow domestic legislation, in accordance with the ad hoc procedures agreed on with the Bank, which are compatible with Bank procedures.

## **I. FRAME OF REFERENCE**

### **A. Quito's geography**

- 1.1 Quito is the country's capital and second-largest city. With a population of about 1.8 million in the metropolitan area, the city is growing by 2.8 percent a year and the nearby rural parishes are growing at a rate of 3.5 percent.<sup>1</sup> Quito lies in an Andean valley that runs north-south and is flanked by mountains on the east and west. Many streams run down to the city from the mountains, crossing it and emptying into the Machángara and Monjas Rivers. These streams have been channeled as they cross the city since colonial times, which determined the maximum amount of water that can be carried.
- 1.2 Quito is located in an area with broken topography, steep slopes, close to active volcanoes and with frequent seismic activity. The city's growth—which led to the paving of a large part of the area, the cutting down of trees and elimination of plant cover—has led to an increase in surface runoff and erosion in the stream beds. These phenomena cause high water levels that cannot be carried by the canals that cross the city, leading to floods and mudslides in the inhabited areas on the slopes, placing human lives at risk and overloading the city's sewer system.

### **B. The water and sanitation sector**

#### **1. Service coverage and quality**

- 1.3 Ecuador has a population of close to 12 million, with 63 percent living in urban areas. According to the Ministry of Urban Development and Housing (MIDUVI), at the end of the 20th, 81.5 percent of the urban population had connections or easy access to drinking water and 70.5 percent had connections to sewers or a sanitary sewage removal system. In rural areas, the percentages drop to 51.5 percent and 37 percent, respectively. Despite the progress made in coverage, the figures indicate that a significant number of Ecuadorians still do not have access to these services. Furthermore, 92 percent of urban sewage is disposed of untreated.
- 1.4 The apparently high coverage masks major shortcomings in the quality of service. In most places service is deficient, with poor continuity in supply, problems with water quality, high levels of unmetered water—estimated at an average of 65 percent countrywide—low coverage of residential metering, rates that are too low and, in general, inefficient administration that results in significant losses from bills not collected.<sup>2</sup> The shortcomings in the services are a factor in the high levels of water-borne diseases that are reported in the country.

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<sup>1</sup> Parish is the smallest political-administrative jurisdiction. Parishes make up cantons (or municipalities), the cantons make up the provinces, and the provinces make up the country. Parishes can be urban or rural.

<sup>2</sup> MIDUVI, "Política Nacional de Agua Potable y Saneamiento Básico", June 2001.



## **2. Institutional aspects and the legal framework of the potable water sector**

- 1.5 Decentralization of the water and sanitation systems of the former Instituto Ecuatoriano de Obras Sanitarias (IEOS) [Ecuadorian Sanitary Works Authority] transferred responsibility for the systems to the municipalities at the start of the last decade. MIDUVI is responsible for sector policy. However, various entities still act as policy formulators, regulators and entrepreneurs, multiple regulatory frameworks coexist and there is overlapping of functions among the institutions involved.
- 1.6 At the end of the 1990s, the country tried to resolve the above-mentioned problem. With Bank support, it prepared a draft sector law which, in addition to establishing a modern legal framework, created a regulatory agency on the national level. The country's political instability and the perception of the loss of municipal autonomy prevented the bill from being passed by congress.
- 1.7 In legal terms, there are three main pieces of legislation that regulate the sector: (i) the State modernization law, which provides the legal context for private sector participation; (ii) the municipal systems law, which regulates municipal responsibilities for water and sanitation; and (iii) the Health Code, which establishes drinking water quality and other health parameters.
- 1.8 With Bank support,<sup>3</sup> the Ecuadorian government has made a new start on preparing a draft sector law, which is expected to be presented to Congress during 2003. The draft has the support of the municipalities through the Asociación de Municipalidades del Ecuador (AME) [Association of Municipalities of Ecuador] and the involvement of the Consejo de Modernización del Estado (CONAM) [State Modernization Council] and the Undersecretariat of Potable Water and Basic Sanitation. The law will create a national sector regulatory agency and will define rules to eliminate the overlapping of responsibilities between agents and define clear rules.
- 1.9 Despite the situation, Ecuador has been able to involve the private sector in the delivery of water and sewer services in the case of Guayaquil, under a concession supported by the Bank,<sup>4</sup> and in the municipalities of Esmeraldas and Quevedo.

## **3. Sector policy**

- 1.10 MIDUVI's sector policy is based on the following principles: (i) universal coverage; (ii) active participation by civil society and the government in establishing policy; (iii) decentralization of the delivery of water and sewer

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<sup>3</sup> Loan to support foreign investment in infrastructure (1136/OC-EC).

<sup>4</sup> Loan for a program of concessions of potable water and sanitation services in Guayaquil to the private sector (1026/OC-EC), which adopted a scheme for regulation and contracting.

services; and (iv) a distinction between regulation and control and the provision of water and sanitation services. The government's sector policy and the present proposal are consistent with Bank policy.

#### **4. Regulatory scheme**

- 1.11 Since the government was in the process of drawing up draft legislation establishing a national regulatory framework for the sector when this project was being prepared and therefore we do not know what system of regulation will be adopted in the end, the proposed program provides for a regulatory scheme in the form of management and rate audits, based on the guidelines described in Chapter III of this proposal.

#### **C. The Empresa Metropolitana de Alcantarillado y Agua Potable de Quito (EMAAP-Q)**

- 1.12 Created out of the merger of the water (Empresa de Agua Potable) and sanitation (Empresa de Alcantarillado y Desagües) companies, EMAAP-Q's mission is to provide drinking water, collect, treat and dispose of sewage, and collect and channel rainwater. Its area of action is the metropolitan municipal district of Quito.
- 1.13 The works partially financed with the loan for potable water and sanitation for Quito (823/OC-EC), are expected to be completed in late 2002, at which time coverage will reach 85 percent of the urban population for water and 65 percent for sewers. Quito does not have any sewage treatment facilities. The quality of the water and continuity of the service are acceptable, although an estimated 38 percent of the water is not accounted for (physical losses of 15 percent and commercial losses of 23 percent). Although sewage is not treated, the receiving rivers are able to recover their water quality in a relatively short time owing to good aeration facilitated by the steep slopes.
- 1.14 Since the main intakes for Quito's water supply are located on the western side of the Andes, some of the water has to be pumped and reaches the city at a high altitude. To recover part of the energy used in pumping, the company uses the falling water to generate electricity. The power produced by the plants is sold to the electric power distribution company in Quito at market prices (US\$0.045 per kWh), and part of the energy goes to supply EMAAP-Q.
- 1.15 According to a municipal ordinance, water and sewer rates should guarantee financial self-sufficiency. Rates should be based on the long-term marginal cost and produce sufficient income to cover operating costs, service the debt and help to finance the expansion program. The ordinance sets the sewer rate at 38 percent of the rate for water but makes no mention of charges for sewage treatment. The general manager of EMAAP-Q is responsible for setting the rates and reports to the company's board of directors on his decisions. The physical, chemical and

bacteriological quality of the water is monitored by the Ministry of Health, although not continuously or statistically. Continuity of the service and pressure are not regulated.

- 1.16 EMAAP-Q's rate structure in December 2001 established a fixed charge of US\$1.17 for residential water consumption and a rate of US\$0.16/m<sup>3</sup> for the first 30 m<sup>3</sup> of water consumed—corresponds to operating and maintenance costs—and US\$0.22 for the next 30 m<sup>3</sup>—corresponds to operating and maintenance costs and depreciation—and US\$0.38 for consumption above 60 m<sup>3</sup> a month. The commercial and industrial rate is US\$0.38/m<sup>3</sup> for all consumption ranges. In January 2002, a resolution was approved increasing the rates by 3 percent a month during the year—42.5 percent cumulative to December 2002—and the new intermediate consumption ranges were changed to 25 m<sup>3</sup>/month and 50 m<sup>3</sup>/month. Owing to changes in relative prices and to the fact that the 2001 census indicates that the population of the metropolitan district of Quito did not grow as much as forecast, it has become necessary to update the long-term marginal cost.
- 1.17 This rate structure is not economically efficient and causes distortions in the economy, which makes it necessary to target subsidies to low income consumers and not to low consumption.
- 1.18 Quito has a combined sewer system, meaning that the same pipe carries off sewage and rainwater. The consequence is that flooding poses a higher health risk and that the sewer system has to include channeling of the streams that cross the city. The minimum-cost solution to this problem is to build small dams before the streams enter the channels, in order to reduce the maximum flow. The Mt. Pichincha slope protection program (935/OC-EC) built a solution of this kind in the northern part of the city with successful results. The investments in flood-prevention works should not be charged to the company, since the rates it receives only cover investments in water and sewerage. Therefore, the municipality will help to finance the slope protection works through the counterpart funding and repayment of part of the corresponding funding.
- 1.19 As for the costs of operating and maintaining the storm drains, the municipality transfers 5 percent of the property tax (about US\$2 million) to the company, which is not enough to cover the costs. The real and efficiency costs will be determined during the program and formulae will be worked out to update them.

#### **D. Private sector participation**

- 1.20 EMAAP-Q has begun a process to include the private sector by outsourcing certain services. The proposed program will increase private participation through the concession of the eastern parishes (EPs) zone and full management of part of the commercial area. The company has outsourced the cadastre, metering, billing, collections and customer services, under renewable short-term contracts, which can

be improved in aspects such as fragmentation of contracts, suitable assignment of responsibilities and the lack of incentives to promote efficiency.

- 1.21 With outsourcing, the results for 2004 will be customer complaints of 2 percent, collection of amounts billed of 86 percent, real metering of 79 percent and operational meters of 82 percent. The company, seeking to improve its results and considering the duration of some of the existing contracts, has decided on: (i) full private management of 50 percent of the commercial area; and (ii) reformulation of existing contracts to correct the shortcomings identified.
- 1.22 EMAAP-Q has decided to grant a concession over the eastern parishes zone, which currently has 16,000 connections and a population of about 100,000. The zone is one of Quito's fastest growing areas with mainly middle and high income residents. Quito's new airport will be located in that zone. The investment project is expected to include water treatment and a distribution system, for an estimated cost of US\$25 million. Studies on participation by the private sector in the EPs will be financed out of the proceeds of the program to support private investment in infrastructure (1136/OC-EC).
- 1.23 Private sector participation in managing part of the commercial operations and participation by the private sector in the EPs is consistent with the studies conducted when the operation proposed here was being prepared. The social and political variables in private sector participation in Ecuador, the high cost of capital, coinciding interests inside and outside the company, experience with the Empresa Cantonal de Agua Potable y Alcantarillado de Guayaquil (ECAPAG) [Water and Sewer Company of Guayaquil] and progress in private sector participation in the commercial area made by the company suggest that the strategy is financially and politically feasible.

#### **E. The Bank's country and sector strategy**

- 1.24 The country paper currently being prepared presents the Bank's objectives and strategies: (i) stabilization of the economy; (ii) poverty alleviation and human capital formation; (iii) efficient management of infrastructure with private sector participation; and (iv) modernization and decentralization of the State and promotion of sustainable regional development. Ecuador's environmental strategy includes the conservation and use of natural capital, control and mitigation of the deterioration of fragile and threatened ecosystems and promotion of environmental quality.
- 1.25 By supporting the control and protection of vulnerable zones in Quito, the program will address one of the city's most critical socioenvironmental problems that puts human lives at risk and affects growth and the quality of life in large parts of the city. The program follows the recommendations of the Bank's natural disaster prevention policy, which gives priority to measures to reduce vulnerability, and

proposes to finance disaster prevention and mitigation and strengthen risk management capacity.

- 1.26 Also, better public utilities are one way of reducing poverty levels and improving health indexes. The proposed operation fits into this strategy, since it improves water and sewer service in Quito, by expanding systems, particularly sewer services, into areas not presently served. The project will contribute to the efficiency and sustainability of water and sanitation services by including the private sector in the management of EMAAP-Q.

#### **F. Past loans and loans in execution**

- 1.27 The Bank has participated in improving water and sewer services in Quito through seven loans for a total of US\$207.5 million. The two most recent operations are:
- a. **The Mt. Pichincha slope protection program (935/OC-EC).** EMAAP-Q has been successfully executing this program approved in 1996, which is over 87 percent disbursed and fully committed. The objective of the program is to control flooding and mudslides on the eastern flanks of the Pichincha volcano, which affect 6,700 hectares. The works and actions have proven to be very effective in the protected part of the city, as has been apparent during the last two rainy seasons.
  - b. **The Quito potable water and sanitation project (823/OC-EC).** This loan was approved in 1994 and it has been fully committed and 90 percent disbursed. Its execution is rated satisfactory. The project's objectives are to improve the potable water system, increase coverage of the sewer system and strengthen EMAAP-Q institutionally. The proposed objectives are being achieved without major difficulties.

#### **G. Lessons learned**

- 1.28 The following aspects are worth noting in execution of loan 935/OC-EC: (i) the effectiveness of the water regulation and mudslide control works, which have made it possible to control periodic flooding; (ii) the effectiveness of coordination among the public agencies working in conjunction with the community; (iii) the creation of community microenterprises to collect and dispose of trash in zones on the slopes where access is difficult; and (iv) the technical assistance provided for the communities in natural resource management and hygiene. Some of the problems encountered in the program include delays in the bid process, lengthy expropriation proceedings, and problems owing to the geotechnical characteristics of some of the works.
- 1.29 The following aspects are worth noting in execution of loan 823/OC-EC: (i) ambitious goals should not be established for loss reduction without having universal residential metering, a program for meter maintenance and the system

prepared to allow for the necessary pitometer tests; (ii) rationalization of company staff, reducing the number of employees per 1,000 connections significantly, from ten to six; (iii) the successful merger of the companies; and (iv) success in the other program goals indicates that EMAAP-Q is a good executing agency.

## **H. Design of the operation**

- 1.30 The strategy agreed on by the government and the Bank to support the strengthening of municipal finances and efficient management of public utilities recommends institutional reforms and private sector participation in the provision of water and sanitation services, particularly in areas where the city is growing.
- 1.31 The need to support the municipality and EMAAP-Q in institutional and financial reforms to improve the company's performance was identified when the proposed program was being prepared. The reforms include: (i) setting rates at the long-term marginal cost; (ii) establishing a fund to subsidize the basic consumption of low-income families; (iii) establishing a regulatory mechanism; and (iv) separating the costs of sanitary sewers and storm sewers. These reforms require studies and political will for their successful implementation.
- 1.32 The master plans for water and sewer systems and flood control have estimated the EMAAP-Q's investment requirements over the next 20 years at about US\$300 million. To cover these investment levels, the involvement of private capital in expanding the systems would be desirable. The Banks' participation in this process is very important for EMAAP-Q and the municipality, since it will confer greater transparency on the process and, as a consequence, boost the confidence of private investors in it.
- 1.33 The combination of the aspects mentioned above suggests that the program should be executed in stages on the basis of loan disbursements, since the company will have to take institutional and financial measures to complement the ones it has already taken. Those measures require monitoring and a maturity period estimated at between two and four years.
- 1.34 It is technically possible to divide the project into two stages, since the works to expand water and sanitation services are repetitive in nature—as are the flood control works—and operate independently. Completion of a given work brings benefits that do not depend on execution of the others.
- 1.35 In the first stage of the proposal, in addition to the investment resources, funds will be made available to permit the company to take steps to boost its efficiency. If, during the first stage, the company achieves the levels stipulated for a series of performance indicators that would be included in the prospective loan contract, in addition to making significant progress in including the private sector in management, then the Bank could propose approval of the second stage.

- 1.36 The water and sanitation sector in Quito has received financial and institutional support from the Bank to date through seven loans. The proposed operation is a logical consequence of the institutional evolution of the company and the sector.

## II. THE PROGRAM

### A. Objectives and description

- 2.1 The program is a global multiple-works program to be executed in two stages. The costs mentioned in this proposal refer to the first stage.
- 2.2 The program has the objectives of reducing flooding, mudslides and landslides, expanding water and sewer services in MDMQ priority areas, and building institutional capacity for efficient management of the water and sewer services provided by EMAAP-Q.
- 2.3 The program has the following goals.
  - a. Stage one: (i) reduction of the damage to urban infrastructure and housing caused by torrential rainfall in at least two ravines in the central-south part of the city, including the El Tejar ravine; (ii) expansion of water and sewer services to the communities of Calderón, La Josefina and Los Pinos.
  - b. Stage two: (i) consolidation of EMAAP-Q as an efficient and financially sustainable company in the long term; (ii) rehabilitation and reduction of damage to the urban infrastructure and housing caused by torrential rainfall in ravines in the center-south part of the city; and (iii) expansion of water and sewer services in priority areas of the city.

### B. Program components

#### 1. Component I. Slope management and flood control (US\$15 million)

- 2.4 Control of floods, landslides and mudslides requires a series of interventions that complement the physical works, including land use planning in the affected areas, management of ecologically fragile zones and resettlement of families living in risk areas. This component has four subcomponents.
  - a. **Works for water regulation, slope stabilization and the repair and expansion of storm drains (US\$11 million):** Includes labor, materials and equipment for civil works, the procurement and installation of pipes and electromechanical equipment that forms part of the slope management and flood control system, the costs of community development, conservation of green areas and the creation of microenterprises to collect trash.
  - b. **Management and conservation of urban and rural green areas (US\$1.5 million):** This subcomponent will include funds for the development and conservation of green spaces in slope management areas.



- c. **Community development (US\$500,000):** This subcomponent will include the establishment of community microenterprises to collect trash and community education for citizen participation.
- d. **Family resettlement (US\$2 million):** Families living in areas at risk of events caused by extreme rainfall and families whose housing interferes with the construction of program works will be resettled.

## **2. Component II. Potable water and sewer works (US\$21.03 million)**

2.5 Rehabilitation and expansion of water systems in priority areas. Construction of trunk sewers, intercepting sewers, discharge works and branch lines for the existing sewer system in neighborhoods and parishes that already have potable water services. This component has two subcomponents.

- a. **Water works (US\$14.53 million).** Includes labor, materials and equipment to build civil works and to procure and install pipes and electromechanical equipment to rehabilitate and expand the water system (water conveyance and distribution lines and residential connections).
- b. **Sewer works (US\$6.5 million).** Includes pipes and labor, materials and equipment for transport, laying and testing to expand the sewer system, including civil works, inspection chambers, etc.

## **3. Component III. Institutional strengthening (US\$1.6 million)**

2.6 This component has three subcomponents:

- a. **Private sector participation (US\$500,000).** The estimate includes consulting services to contract part of the commercial management of EMAAP-Q out to the private sector and to optimize the part that the company will retain. Studies will be financed to contract a specialized company to manage about 50 percent of the company's current commercial operations. The management contract includes activities ranging from the cadastre, metering, billing, installation and repair of meters, investments in the commercial area, to cutting off service and providing customer services. For the other 50 percent, consulting services will be contracted to reformulate existing contracts with third parties in an effort to raise efficiency. Financing will also be provided for a communications campaign inside and outside the company on private sector participation. The company needs to perform studies on comprehensive consulting services for participation by the private sector in the delivery of water and sanitation services in the eastern parishes of metropolitan Quito that will be financed with proceeds from loan 1136/OC-EC, which is being financed by the Bank and executed by CONAM. The terms of reference for participation by the private sector have been agreed upon with EMAAP-Q and steps to streamline contracting of the consulting firm have been agreed on with CONAM, including a review of

prequalified firms and draft legal documents to launch the process. However, in the event that CONAM funds are not made available at the times envisaged, these studies will be financed with funds from the contingency category of the proposed loan.

- b. **Institutional strengthening for the municipality (US\$300,000).** Municipal capacity to implement in a pilot area the general plan for land development of the MDMQ, which regulates land use, will be strengthened.
- c. **Institutional strengthening for EMAAP-Q (US\$800,000).** Involves works and actions to reduce the cost of providing services, such as the program to control unbilled water and expansion of the hydrometeorological monitoring system. Also includes studies on establishing a fund for direct subsidies for low-income consumers and on updating the costs of the services.

### C. Financial conditions

- 2.7 The Bank will contribute 80 percent of the cost of the proposed program, equivalent to US\$40 million, from the Ordinary Capital, to be disbursed in US dollars from the Single Currency Facility, in accordance with Bank policies, under the conditions shown in Box 2.1. Box 2.1 presents the budget broken down into categories.

<b>Box 2.1</b>	
<b>Financial conditions</b>	
Interest rate	variable
Credit fee	0.75%
Inspection & supervision	1%
Disbursement period	4 years
Grace period	4 years
Amortization period	25 years
(includes grace period)	

**Table 2.1**  
**Cost and financing**  
(in US\$ thousands)

Category	IDB/OC	LOCAL	TOTAL	%
<b>1. Engineering and administration</b>	<b>4,470</b>	<b>30</b>	<b>4,500</b>	<b>9.00%</b>
1.1 Executing unit	1,190	10	1,200	2.40%
1.2 Works supervision	1,790	10	1,800	3.60%
1.3 Studies and projects	1,490	10	1,500	3.00%
<b>2. Direct costs</b>	<b>32,900</b>	<b>4,730</b>	<b>37,630</b>	<b>75.26%</b>
<b>2.1 Slope management and flood control</b>	<b>12,000</b>	<b>3,000</b>	<b>15,000</b>	<b>30.00%</b>
a) Hydraulics, slope stabilization, drain repairs	8,700	2,300	11,000	22.00%
b) Management & conservation of green areas	1,000	500	1,500	3.00%
c) Community Development	300	200	500	1.00%
d) Family resettlement	2,000	0	2,000	4.00%
<b>2.2 Water and sewer works</b>	<b>20,900</b>	<b>130</b>	<b>21,030</b>	<b>42.06%</b>
a) Water works	14,450	80	14,530	29.06%
b) Sewer works	6,450	50	6,500	13.00%
<b>2.3 Institutional strengthening</b>	<b>0</b>	<b>1,600</b>	<b>1,600</b>	<b>3.20%</b>
a) Private sector participation	0	500	500	1.00%
b) Municipality	0	300	300	0.60%
c) EMAAP-Q	0	800	800	1.60%
<b>3. Concurrent costs</b>	<b>400</b>	<b>721</b>	<b>1,121</b>	<b>2.24%</b>
3.1 Lands and rights-of-way	0	721	721	1.44%
3.2 Audits	400	0	400	0.80%
<b>4. Unallocated</b>	<b>1,830</b>	<b>280</b>	<b>2,110</b>	<b>4.22%</b>
4.1 Contingencies	910	140	1,050	2.10%
4.2 Escalation	920	140	1,060	2.12%
<b>5. Financial expenses</b>	<b>400</b>	<b>4,239</b>	<b>4,639</b>	<b>9.28%</b>
5.1 Interest during construction	0	3,759	3,759	7.52%
5.2 Credit fee	0	480	480	0.96%
5.3 Inspection and supervision fund	400	0	400	0.80%
<b>TOTAL</b>	<b>40,000</b>	<b>10,000</b>	<b>50,000</b>	<b>100.00%</b>
<b>%</b>	<b>80.0%</b>	<b>20.0%</b>	<b>100.0%</b>	

### III. PROGRAM EXECUTION

#### A. Program execution and administration

- 3.1 The executing agency will establish a program executing unit (PEU) that will be responsible for all aspects of program administration and execution. The head of the PEU will be the interlocutor with the Bank on matters relating to program execution. **As a condition precedent to the first disbursement, the PEU must have been established and be running as an office attached to the general management with the minimum complement of staff needed for the discharge and performance of its functions. Establishment of the PEU will include the creation of a unit for inspection and supervision of project works.**

#### B. Program execution plan

##### 1. Works

- 3.2 Construction of the works will be contracted through a bid process based on Bank procedures. The slope protection and flood control component will build works in the El Tejar ravine and tentatively in the Jerusalén and Navarro ravines. The potable water component will build works in the localities of Calderón and Los Pinos. The sewer works are planned for the localities of El Arenal de Calderón, La Josefina and Los Pinos. EMAAP-Q will establish and staff a works supervision unit that will report to the PEU.

##### 2. Operating Regulations

- 3.3 The program will be governed by Operating Regulations, whose preliminary version has been agreed upon with EMAAP-Q. The regulations establish the eligibility conditions for the works to be included in the program and environmental technical specifications for construction, operation and maintenance of the works. **Placing the final version of the Operating Regulations in effect will be a condition precedent to the first disbursement.**

##### 3. Private-sector participation

- 3.4 EMAAP-Q's Unit for Private Sector Participation, which will report to the company's general manager, will execute this component through international calls for tenders to contract consultants to prepare the pertinent studies. A communications process will be undertaken within the company and with society to create favorable conditions for execution of this component and the component for participation by the private sector in the eastern parishes, financed from loan 1136/OC-EC. The Unit for Private Sector Participation will contract the services of a specialized communications firm.

- 3.5 The Unit for Private Sector Participation will begin the process of involving the private sector in the EPs, which includes completing and negotiating with CONAM the legal documents and terms of reference for selecting and contracting the investment bank. With support from the investment bank, it will also undertake the process of selecting, negotiating and transferring the EPs to the private sector. Participation by the private sector in the EPs includes responsibility for executing an investment project costing about US\$25 million in the EPs and transferring the assets to EMAAP-Q at the end of the concession period.
- 3.6 Full private management of 50 percent of the commercial area will require: (i) implementation of a business management model; and (ii) compliance with management indicators to be defined. Part of the remuneration received by the private manager will be based on compliance with the indicators. For the other 50 percent, the current contracts with third parties will be reformulated to: (i) group the activities covered in the existing contracts and define responsibilities more clearly; and (ii) establish incentives through contracts in which part of the remuneration will depend on successful performance. Performance indicators will be defined for the commercial area to allow management under the two arrangements to be compared.
- 3.7 The company is required to establish the concessions unit prior to the first disbursement. Within six months after the contract becomes effective, the company will also be required to contract a specialized firm to conduct the communications campaign inside the company and directed to users, which will present: (i) the need for private sector participation in the company and the ensuing benefits for users; and (ii) the greatest possible transparency in the process. **The creation and start up of the Unit for Private Sector Participation, with the necessary staff, will be a condition precedent to the first disbursement.**
- 3.8 **Six months after the effective date of the contract, the following consulting services must have been engaged** (a) a specialized firm to be in charge of designing and disseminating a publicity campaign to communicate the benefits and advantages of private sector participation in the company to the company and users; and (b) a specialized firm in charge of performing studies to appraise the value of the company's fixed assets.
- 3.9 The studies for full management of 50 percent of the commercial area and the studies on reformulation of the outsourced contracts for the other 50 percent will be contracted and completed within one year after the loan contract becomes effective. By twenty-four months after the contract comes into force, the company will have contracted the private manager for 50 percent of the commercial area and the investment bank for the EPs. Last, 36 months after the contract comes into force, arrangements will be made for the private sector to take part in the bidding on the EPs. **Contracting and completion of the studies on management of the commercial area, contracting of a private manager for about 50 percent of the**

**commercial area, contracting of an investment bank for the EP private sector participation, and the calls for bids for EP private sector participation will be conditions that must be covered in the annual work plans during project execution.**

#### **4. Operational and institutional improvements in EMAAP-Q**

- 3.10 Operational and institutional improvements in EMAAP-Q will be executed by consulting firms with international experience, contracted through competitive bidding in accordance with Bank procedures. The following consulting services will be contracted: (i) a study on the creation and implementation of a fund for direct subsidies for consumption by low-income users; (ii) a study to update the long-term marginal cost and restructure the rate scheme for water and sewer services in Quito; (iii) a study of the operating and maintenance costs of the works for slope protection and storm drains.
- 3.11 The studies will be contracted within the first year after the loan contract is signed. This component also includes procurement of hardware and software for a georeferenced system of the distribution system and of materials and equipment to detect leaks in the system and to expand the hydrometeorological network. **Contracting of the studies on costs, rates and the subsidy fund will be a condition that must be covered in the annual work plans.**

#### **5. Fund for targeted subsidies**

- 3.12 The results of the study will be used to establish the fund, whose purpose will be to subsidize the basic consumption of low-income families and to finance water and sanitation investments in metropolitan Quito. The fund will be established by EMAAP-Q and the municipality and will be managed by a board of directors composed of representatives of the two institutions and civil society. The fund will be financed from the municipal budget but at the start and for as long as they are available, funds obtained under the Water and Sports Act will be used.
- 3.13 The fund will have a roster of low-income users based on the low-income user identification system (SELBEN) established under loan 1261/OC-EC. Eligibility for the subsidy will be based on the ability to pay for basic consumption. The ability to pay of a family is estimated as 3 percent of household income for water and 5 percent for the combination of water and sewer services. The subsidy fund should be operating before the end of the third year of the program so that a rate structure based on long-term marginal costs can be introduced. **Establishment of the fund to subsidize low-income consumers will be a condition that must be covered in the annual work plans.**

## **6. Preparation of projects not included in the sample**

- 3.14 Consulting services will be contracted in accordance with Bank procedures to prepare projects not included in the sample.

### **C. Status of program preparation**

#### **1. Slope management and flood control**

- 3.15 The project for flood control in the El Tejar ravine (US\$6.5 million) was considered viable. The projects for the other works will be prepared during the first year of the program and terms of reference approved by the Bank are available for them.

#### **2. Potable water and sewer service**

- 3.16 The water projects prepared for the Calderón and Los Pinos areas (US\$15 million) were considered feasible and no other drinking water works are envisaged during stage I. Sewer service projects were analyzed for the La Josefina and Arenal de Calderón communities (US\$3.5 million) and were considered feasible from the socioeconomic standpoint. The sewer service project for the Los Pinos area is being prepared and will be available in June 2002.

#### **3. Institutional strengthening**

##### **a. Private sector participation in management of EMAAP-Q**

- 3.17 Preliminary terms of reference are available for the bidding to hire a consulting firm that will prepare the studies for full commercial management, which have been discussed with EMAAP-Q. Preliminary terms of reference and legal documents are also available for contracting the investment bank for participation by the private sector in the EPs. Procedures to facilitate contracting of the investment bank within the time limits have been agreed upon with CONAM.

##### **b. Operating and institutional improvements in EMAAP-Q**

- 3.18 Terms of reference have been prepared for the study to update the long-term marginal cost. The other terms of reference are being prepared and are expected to be submitted to the Bank for approval by the start of program execution.

### **D. Environmental and social aspects**

- 3.19 At its meeting on 3 August 2001, CESI/TRIG studied profile II of the operation and asked to have a local environmental assessment (EAL) performed. All of its recommendations have been included in this proposal. The results of the assessment were made available for public consultation at EMAAP-Q's offices from 26 December 2001 to 15 January 2002. Fourteen consultations were received and

two of them made written comments that were included in the final version of the EAL.

- 3.20 The positive impacts are: (i) landslides, flooding and mudflows will be controlled and infrastructure protected; (ii) erosion in green areas will be controlled; (iii) sites where clandestine landfills have been established will be terraced and reforested; (iv) the dumping of trash into the ravines will be eliminated; (v) the public will be brought into the management of green areas and risk mitigation; (vi) support will be provided for the creation of community microenterprises to collect trash in the ravines; (vii) water and sewer service will be provided in the final stage of the project for about 200,000 people (water) and 74,000 people (sewers); (viii) support will be provided for citizens through the establishment of a network of community organizations; and (ix) 54 families living in risk areas will be resettled.
- 3.21 A preliminary resettlement plan has been prepared based on the Bank's policy (OP-710), which will serve as the model for resettlements in other projects not included in the sample. The final resettlement plan must be approved by the Bank prior to calling for bids for the works and the families must be completely resettled prior to beginning the works. The amount included in the cost table for this item was estimated on the basis of the resettlement of families at risk in the El Tejar ravine and others that will be resettled on account of other program works. **The additional requisites prior to calling for bids and starting the works will be included as contractual conditions.**
- 3.22 The negative impacts of the operation will occur during construction and maintenance of the works, but will be temporary, localized and easy to control. The program has technical environmental and social specifications to mitigate the impact, which will be included in the bid documents and construction contracts.
- 3.23 The Municipality of Quito has an integrated water and sewer service master plan that provides for the construction of 14 secondary sewage treatment plants commencing in 2012. Re-aeration of the Machángara River promotes drops in DBO<sub>5</sub> from 120 mg/l to 40 mg/l over a 13-km section. In that section of the river, concentrations of dissolved oxygen rise from 1 mg/l to 5 mg/l, which is sufficient to maintain a diversified ecosystem, without disagreeable odors. Water quality in the river is suitable for restricted irrigation 70 km downstream from the discharges.

## **E. Procurement**

- 3.24 EMAAP-Q will be responsible for procurement of goods and related services and contracting works in accordance with the Bank's rules and procedures stipulated in Annex B of the loan contract. International competitive bidding will be required for procurement of goods costing US\$250,000 or more and works costing US\$3 million or more. Consulting services will be contracted in accordance with Annex C of the loan contract and international competitive bidding will be used for



contracts over US\$200,000. Bids below these thresholds will follow domestic legislation, in accordance with the ad hoc procedures agreed on with the Bank. The applicable legislation is compatible with Bank procedures. Presented in Annex III-1 is a tentative procurement schedule and the estimated cost of the lots.

## **F. Cost recognition**

- 3.25 EMAAP-Q has requested recognition from the loan of costs incurred for program preparation during the 12 months prior to approval of the loan, in the amount of US\$500,000.

## **G. Operation and maintenance**

- 3.26 The works built will be operated and maintained by EMAAP-Q, which has the technical staff and means for proper operation and maintenance. EMAAP-Q will present to the Bank annually for 10 years counted from completion of the first work in the program, within the first calendar quarter of each year, an annual O&M plan for the systems financed with loan proceeds, which should include a report on management in the preceding year and on the condition of the systems. **O&M obligations will be contractual conditions.**
- 3.27 The municipality will have to pass a resolution prior to the end of the second year of the loan contract, adjusting the percentage of the property tax to be earmarked for O&M of the flood control system and storm drains, as calculated in the related studies.

## **H. Execution period and disbursement schedule**

- 3.28 The execution period of the first stage of the program will be four years, with a minimum of three years. The term for the material start of the works will be three years after the loan contract becomes effective. Box 3.1 summarizes the disbursement schedule. Projects in the sample costing US\$25 million are ready for tendering, which will make it possible to achieve the volume of disbursements shown.

<b>Box 3.1</b> <b>Disbursement schedule</b> (in US\$ thousands)				
<b>Year</b>	<b>IDB</b>	<b>Local</b>	<b>Total</b>	<b>%</b>
1	5,000	1,250	6,250	12.50
2	12,500	3,125	15,625	31.25
3	12,500	3,125	15,625	31.25
4	10,000	2,500	12,500	25.00
<b>Total</b>	<b>40,000</b>	<b>10,000</b>	<b>50,000</b>	<b>100.00</b>
<b>%</b>	<b>80</b>	<b>20</b>	<b>100</b>	

## **I. Revolving fund**

- 3.29 After all the conditions precedent to the first disbursement have been complied with, the Bank may advance funds from the loan to establish a revolving fund of up

to a maximum of 5 percent of the total cost of stage I. The funds are to be kept in a special bank account in the name of the program. EMAAP-Q will present to the Bank within 60 days after the end of each six-month calendar period consolidated reports on the status of the revolving fund.

**J. Follow-up and evaluation**

- 3.30 The Bank's Country Office in Ecuador (COF/CEC) will be responsible for program supervision and follow-up. EMAAP-Q will present an initial report to the Bank containing the program's work plan and detailed execution schedule. It will also present an annual operating plan to the Bank at the start of each year, including the levels of the performance indicators, which are described in the following section, to be obtained during the year.
- 3.31 The reports prepared by COF/CEC on the status of the loan will include problems encountered during the program and the solutions to them. A summary of these aspects will be included in the annual report on the Bank's portfolio in Ecuador. The results of the program will be evaluated by the Bank in the project completion report to be prepared by COF/CEC within 90 days after the final disbursement of the loan.

**K. Performance indicators**

- 3.32 Stage I of the program will be evaluated on the basis of the indicators established in the Logical Framework (Annex III-2). Table 3.1 shows the most important ones together with the levels expected to be obtained for each of them at the end of each year of execution.

**Table 3.1**  
**Performance indicators**  
**(levels at the end of each year)**

Indicator	2003	2004	2005	2006
Operating margin [%]	30	35	40	40
Collection efficiency [%]	87	87	90	90
Employees for every 1,000 connections	6	6	5	5
Residential meters [%]	70	75	80	85
Index of meters read [%]	80	85	90	90
Management and rate audits	P	P	P	P
Contracting the investment bank	T	C		
Private-sector participation in the EPs			T	
Commercial area management – Consulting services	C			
Commercial area management – Contracting		C		
Rates based on long-term marginal cost			RA	I
Microenterprises for trash collection			O	
Urban and rural green areas management plan		I	O	
Environmental audit				P

P = performed

T = tendered

C = contract

I = implemented

O = operating

RA = resolution approved

## **L. Mid-term review**

- 3.33 A mid-term review of the first phase of the project will be performed by 30 April 2005 at the latest. The review will verify compliance with the performance indicators for each year and general progress made in program execution. To this end, the borrower undertakes to perform jointly with the Bank by 30 April 2005 a mid term review to examine the overall progress made in the project and the extent to which the performance indicators for 2003 and 2004 have been fulfilled and to authorize the commitment of resources in an amount above 60 percent. The commitment of resources above 60% of the total direct costs of the works will only be authorized if those indicators are complied with by the end of 2004. **The mid-term review will be a contractual condition.**

## **M. Triggers for stage II**

- 3.34 The following will be required to continue with Stage II: (i) compliance with the annual levels of the performance indicators during the program; (ii) participation by the private sector in the bidding on the EPs; (iii) management of the commercial area contracted out; (iv) compliance with the rate clause; (v) rates based on long-term marginal costs; and (vi) subsidy fund implemented and operating.

## **N. Data collection**

- 3.35 The borrower will not perform an ex post evaluation of the program. However, to make data available for a future evaluation of the efficiency and effectiveness of the program in achieving the objectives and to draw lessons from the experience, the

borrower will present the Bank with a fiche that must be completed twice—first before the works are built and again one year after the new systems are commissioned. The fiches will contain the following information as a minimum: (i) number of families; (ii) number of water and sewer connections; and (iii) average water consumption per connection. The baseline to be used to measure the effectiveness of the program was established during its preparation. However, information on the health indicators will be obtained during the first year of the program. **The presentation of data to evaluate the efficiency and effectiveness of the program will be a contractual condition.**

**O. Regulatory system**

- 3.36 Since Quito's municipal law clearly defines the criteria for rate setting and the requirement that EMAAP-Q comply with efficiency and quality criteria, during each year of the program, EMAAP-Q will contract a management and rate audit, whose results, furnished in executive summary form, will be attached to the rate conditions approved by the general manager of the company, with a copy to the Bank. The management and rate audit will be contracted with a firm of international standing, with the Bank's nonobjection, using proceeds from the loan. An executive summary of the audit report will be posted on the company's web site. **The hiring of the firm to perform management and rate audits will be a contractual condition.**

#### IV. THE BORROWER, EXECUTING AGENCY, AND GUARANTOR

- 4.1 EMAAP-Q will be the borrower and executing agency and will be legally liable to the Bank for making the local contribution and repaying the debt. The guarantors will be the Government of Ecuador for obligations relating to payment of the principal, including interest and fees, and the Municipality of Quito for obligations relating to compliance with the program's objectives within its sphere of competence and the local counterpart contribution. The municipality will also be responsible to the company for providing the local counterpart for the slope stabilization component, paying EMAAP-Q the proportional part of the debt service for that component and covering the operating and maintenance costs of the storm sewers.
- 4.2 The executing agency will present evidence prior to the first disbursement that EMAAP-Q and the municipality have signed an agreement regarding the conditions for the local contribution and debt payment for the flood control (slopes) component, including operation and maintenance and the ownership of assets. The agreement with the Municipality of Quito to transfer resources and repay part of the loan must be signed as a condition precedent to the first disbursement. **Signature of the agreement with the Metropolitan Municipal District of Quito for the transfer of funds and repayment of part of the loan will be a condition precedent to the first disbursement.** This agreement shall stipulate that: (i) terms, conditions, and obligations for transfer of financing and the activities to be carried out under this component of the project; (ii) commitment by the MDMQ to contribute the amount specified as part of the borrower's contribution to the activities planned under this component; (iii) obligation to reimburse the borrower part of the financing and the financing costs; (iv) cost recovery mechanisms for the aforesaid part of the financing and financing costs; (v) procedures that will apply to expropriation of property, implementation of the resettlement plan, payment of the costs of maintaining and operating the works, and for identification of the property and necessary easements; and (vi) participation by the MDMQ, acting on its own or through its branches in the development and management of urban and rural green areas, garbage collection, and participation by microenterprises in garbage collection.

##### A. Institutional aspects of EMAAP-Q

###### 1. Organizational structure and personnel

- 4.3 **Organizational structure.** The company is administered by a board of directors and general manager. The distribution of functions and responsibilities and coordination among the different management offices is considered adequate. The board of directors establishes company policies and directions and is composed of six members: the mayor of Quito who serves as the chair, two city counselors, a

planning director, a labor delegate and a users' representative. The general manager sits on the board for the purpose of providing information. He represents the company and is answerable to the board for its administrative, technical and financial management. He has the support of six management offices apart from the general manager's office—financial, administration and human resources, institutional development, commercial, project engineering, and operation and maintenance—as well as two advisory units—environmental and legal.

- 4.4 **Personnel.** EMAAP-Q has 1,754 employees, 252 of whom have been contracted temporarily to work on specific projects. The company's incremental personnel is mainly on temporary contracts in the construction area. The number of employees per 1,000 connections is adequate, since at the end of 2001 there were 262,000 water connections, equivalent to six employees per 1,000 connections, a ratio that is in keeping with international standards.

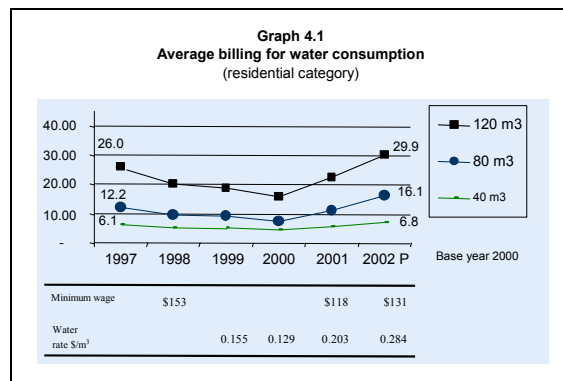
## 2. EMAAP-Q's financial management

- 4.5 **Administrative aspects.** EMAAP-Q's *financial management office* has a suitable accounting system, which meets the needs for financial and accounting information for decision-making and control. The office maintains the accounting records adequately and will establish a financial planning unit that will prepare budgets and financial projections and systematically monitor the company's financial performance.

- 4.6 **External audits.** The company's annual financial statements are audited by an independent firm of public accountants acceptable to the Bank. The reports contain only minor reservations. EMAAP-Q will present to the Bank within 120 days after the close of each fiscal year, the audited financial statements of the program and the company during project execution. The statements will be audited by an independent firm of auditors acceptable to the Bank. In addition to giving their opinion of the financial statements, the auditors will also give their opinion on compliance with the financial clauses established in the loan contract. **Audits of the program's financial statements by an independent firm of auditors will be a contractual condition.**

- 4.7 **Internal audits.** The company's management has issued instructions to the effect that, in addition to routine reviews, a minimum of two audits a year will be performed in the following areas: treasury, accounting, billing and collections, payroll, procurements, and programs with multilateral financing.

- 4.8 **Evolution of rates.** In the last quarter of 2000, rates were increased



by 5 percent a month. In 2001, they were raised by 4 percent a month—for 60 percent cumulative. This year, the company will increase rates by 3 percent a month—for 38.5 percent cumulative. Graph 4.1 shows the impact of the rise in rates on billings in three ranges. As can be seen, between 1997 and 2000 high inflation and currency devaluation caused rates to decline in terms of purchasing power. The trend has reversed, however, since 2001.

- 4.9 **Rate clause in loan 823/OC-EC.** The clause states that income from rates should be sufficient to cover the costs of administration, operation and maintenance and depreciation of the company's revalued fixed assets and, if that does not generate sufficient income for the EMAAP-Q to comply in a timely fashion with its obligations and finance a share of its expansion program, the company and the guarantor will take the necessary steps, to raise such additional funding as may be needed to attain these ends.

- 4.10 Since loan contract 823/OC-EC was signed, the company has paid its obligations in a timely manner. The company's debt coverage index in the last three years has been above 2.1. Its average balance at the close of the year is US\$8.4 million.

Box 4.1 Debt coverage (in US\$ thousands)			
	1999	2000	2001
+ Operating results	(2,506)	(11,087)	(8,497)
+ Depreciation & amortization	12,449	18,002	21,351
+/- Other income/expenditures	9,288	(1,134)	1,395
<b>Internal generation</b>	<b>19,232</b>	<b>5,781</b>	<b>14,249</b>
Interest and fees	2,060	875	810
Long-term obligation	1,873	1,766	1,969
<b>Debt service</b>	<b>3,933</b>	<b>2,641</b>	<b>2,779</b>
<b>Coverage index</b>	<b>4.89</b>	<b>2.19</b>	<b>5.13</b>

However, its operating income—income from rates—has not been sufficient to cover depreciation since EMAAP-Q's assets are overvalued (see Box 4.1).

- 4.11 This situation arose because the company, following Bank recommendations, reevaluated its fixed assets in July 1997, increasing their value from US\$294.8 million to US\$919.7 million. The depreciation base tripled, raising depreciation from US\$8.9 million to US\$18.5 million between 1996 and 1998. Despite the significant effort in rates, EMAAP-Q's operating income, which generates a margin of operating profits of 30 percent, does not cover depreciation because the assets are overvalued.
- 4.12 This conclusion becomes apparent when EMAAP-Q's assets are compared to the assets of other Latin American companies—Aguas Buenos Aires, Aguas Cordobesas, Aguas Santa Fe, Aguas del Illimani. Aguas de Buenos Aires, which serves a population of 7.7 million, had 2.6 million customers at the end of 2000 and fixed assets of US\$1,150 million or US\$442/connection. EMAAP-Q, which serves a population of 1.3 million, has 459,000 customers and its fixed assets are

US\$581 million or US\$1,265/connection. When a similar comparison is made with the other water companies mentioned, the differences are even greater.

- 4.13 In meetings with EMAAP-Q, the company that performed the technical reevaluation (LEVIN) and the auditors Price Waterhouse Coopers detected the following problems associated with the valuation of its fixed assets: (i) reporting of the revaluation; (ii) basic information for valuing the fixed assets; and (iii) separation of the costs of sewers and storm drains.
- a. The company reports own assets and other assets in its books for a total of US\$919.7 million and LEVIN stated in its final report that EMAAP-Q's fixed assets were worth US\$752.4 million.
  - b. Given the absence of records of assets, particularly in sewer systems, the evaluator estimated and assigned: (i) investments; (ii) start up dates; and (iii) a new useful life for assets built between 1940 and 1965, for a total of US\$261 million. These criteria should be revised. For example, it estimated that in two years (1964-1965), the company made investments of US\$198 million, which is unlikely, since the municipality did not have the financial capacity. Mica-Sur (823/OC-EC) for US\$150 million will be executed in six years.
  - c. Sixty-six percent of the restated sewer system fixed assets (US\$485 million) corresponds to storm drains. The company is required to depreciate those assets but does not obtain sufficient income to cover the cost of the storm drains, since its income from the property tax only covers operating and maintenance. LEVIN suggested that the estimated useful life of many of these assets should be revised, given the obsolescence observed since the date of the reevaluation.
- 4.14 Therefore, we opted to perform an analysis by readjusting the value of the fixed assets, taking their value prior to the reevaluation as the base and reporting and depreciating the capital investments made between 1997-2001 and including works under way, executed since 1997. These adjustments adequately value EMAAP-Q's fixed assets and, on that basis, the company has complied with the rate clause since 2001.
- 4.15 During the first year of the proposed program, studies will be contracted to determine the value of the fixed assets. Considering the time required to contract, prepare and approve the studies—six to eight months—the result will probably not be available for the external auditors to give their opinion on compliance with the rate clause of loan 823/OC-EC at 31 December 2002. Therefore it is recommended that compliance with the clause be waived for fiscal year 2002. **Contracting of studies to determine the value of the fixed assets of the company will be a contractual clause to be performed within six months after the effective date of the contract.**



## B. Historical financial analysis

- 4.16 A detailed analysis of the financial situation of the company and the municipality is available in the RE3 technical files.

### 1. EMAAP-Q

- 4.17 The company's financial situation at 31 December 2001 is satisfactory. The net flow of funds from operations was sufficient to cover all debt service and finance approximately

<b>Box 4.2</b> <b>Losses and Earnings</b> (US\$ thousands)			
	1999	2000	2001
Operating income	28,466	26,436	42,874
Operation and maintenance	(18,522)	(19,521)	(30,020)
<b>EBITDA *</b>	<b>9,943</b>	<b>6,915</b>	<b>12,854</b>
<i>EBITDA margin</i>	<i>34.9%</i>	<i>26.2%</i>	<i>30.0%</i>
Depreciation	(12,449)	(18,002)	(21,351)
Other income/(expenditures)	7,228	(2,009)	586
Water Law tax	10,806	9,701	15,888
<b>Profit (loss) for the year</b>	<b>15,528</b>	<b>(3,395)</b>	<b>7,976</b>

\* EBITDA: earnings before interest, taxes, depreciation and amortization

27 percent of the works program. Liquidity is satisfactory and the long-term debt is at acceptable levels. Collection efficiency is acceptable (87 percent) (see Box 4.2).

- 4.18 Despite the fact that earnings before interest, taxes, depreciation and amortization (EBITDA) are equivalent to 30 percent of operating income, they are not sufficient to fully cover depreciation. In the last three years, operating income has been sufficient to cover operating and maintenance costs. The company is EBITDA positive. The increase in its income in 2001 gives the company an operating margin of 30 percent, which is comparable with efficiently managed companies.

- 4.19 The company's operating cash flow (see Box 4.3) between 1999-2001 was US\$35.5 million and covers about 27 percent of its total investment program of US\$130.1 million.

The rest is mainly financed by the Bank. Internally generated resources were sufficient to cover long-term debt service with own funds, with the coverage indexes of 2.2:1 in 2000 and 5.3:1 in 2001, which are good.

<b>Box 4.3</b> <b>Cash flow</b> (in US\$ thousands)				
	1999	2000	2001	Total
Operating cash flow	17.172	4.906	13.440	35.518
Working capital and monetary restatement	(9.781)	926	(5.142)	(13.997)
<b>Cash flow before capital investments</b>	<b>7.391</b>	<b>5.832</b>	<b>8.297</b>	<b>21.520</b>
Investments	(55.137)	(26.389)	(48.662)	(130.189)
<b>Cash flow before financing</b>	<b>(47.747)</b>	<b>(20.557)</b>	<b>(40.365)</b>	<b>(108.669)</b>
Financing	50.473	21.875	36.930	109.278
<b>Cash flow available</b>	<b>2.726</b>	<b>1.318</b>	<b>(3.435)</b>	<b>609</b>
Exchange loss	(2.378)	(2.538)		(4.916)
<b>Balance at year end</b>	<b>8.960</b>	<b>7.740</b>	<b>4.305</b>	<b>4.305</b>

- 4.20 The company's assets at the end of 2001 were US\$620 million.

Fixed assets increased thanks to the execution of projects financed by the Bank. The current index is

1.8:1, which indicates that the company's liquidity is good. Collection efficiency improved over the last three years, rising from 72.5 percent in 1999 to 87 percent in 2001, which is considered acceptable. The balance in accounts collectable at 31 December 2001 was the equivalent of 71 days, which is acceptable since the balance at the end of the year includes much of December's billing (see Box 4.4).

**Box 4.4**

**Balance Sheet**  
(in US\$ thousands)

	1999	2000	2001
Current assets	20,918	27,596	38,445
Net fixed assets	546,616	555,003	581,976
<b>Total assets</b>	<b>567,534</b>	<b>582,599</b>	<b>620,421</b>
Current	10,627	12,776	20,677
Long-term liabilities	149,800	164,575	178,631
Net worth	407,107	405,248	421,113
<b>Total liabilities and net worth</b>	<b>567,534</b>	<b>582,599</b>	<b>620,421</b>

- 4.21 Liabilities at 31 December 2001 were 28.8 percent of total assets. The IDB is EMAAP-Q's main creditor. The company's long-term liabilities are in the order of US\$178.6 million, with US\$166.8 million of that amount being Bank loans.

## 2. The Municipality of the Metropolitan Municipal District of Quito

- 4.22 The municipality's financial situation in 2001 is solid. Internal savings and capital expenditure levels permitted it to post a surplus after paying its capital costs (see Box 4.5).

**Box 4.5**

**Budget performance**  
(in US\$ thousands)

	1999	2000	2001
Current income	30,468	27,285	59,304
Current expenditures	(23,136)	(23,832)	(29,968)
<b>Current savings</b>	<b>7,332</b>	<b>3,453</b>	<b>29,336</b>
Capital income	18,953	23,263	41,520
<b>Capital expenditure available</b>	<b>26,285</b>	<b>26,716</b>	<b>70,856</b>
Capital expenditures	(26,34)	(31,60)	(65,44)
<b>Surplus (deficit)</b>	<b>(55)</b>	<b>(4,885)</b>	<b>5,419</b>

- 4.23 Current tax revenue recovered to 1997 levels (US\$53 million) after shrinking to US\$27.2 million in 1998. This is the result of corrective measures that improved tax revenues, i.e. the adjustment of property values. Current expenditures grew proportionately less than income in 2001, which allowed the municipality to obtain current savings of US\$29 million. This compares favorably with previous years, which peaked at US\$5.8 million in 1998.

- 4.24 Capital income of US\$41.2 million is composed mainly of transfers from the national governments' Social Development Fund. In 2001, transfers of US\$6.2 million were received for current expenditures and US\$35 million for capital expenditures. The municipality makes capital transfers to six zonal administrations. These transfers totaled US\$46 million in 2001, compared with US\$22 million the year before.
- 4.25 Current savings in 2001 coupled with capital income meant that US\$70 million was available for capital expenditures. In 2001, US\$65 million was invested in capital expenditures, for a tax surplus of US\$5.4 million.

## **V. FEASIBILITY AND RISKS**

### **A. Technical feasibility**

- 5.1 The program is feasible and amply justified from the technical standpoint, since it responds to the needs of highly populated urban and rural localities that currently have no water service or receive service that is deficient in quantity, continuity, pressure and, in some cases, water quality. The program also responds to the need to solve public health and environmental pollution problems caused by the absence or insufficiency of sewage collection and treatment.
- 5.2 The studies and basic designs of the projects in the representative sample have been prepared in accordance with national standards in force that coincide with generally-accepted engineering principles. The designs correspond to technically-feasible minimum-cost alternatives.
- 5.3 EMAAP-Q, which is responsible for water and sewer services and flood control, has the technical capacity and experience to contract and supervise the works. There are enough domestic and foreign companies to execute the works and supply local or imported materials and equipment. EMAAP-Q also has experienced technical staff and adequate financial resources to adequately operate and maintain the works to be financed under the program once they are built.
- 5.4 The execution schedule has taken account of the nature of the works, the bid processing periods and the lessons learned during execution of earlier stages.

### **B. Feasibility of private sector participation**

- 5.5 Successful private participation in the water and sanitation sector requires a favorable attitude by users and company employees and executives. A negative reaction to private participation by employees and users is a significant risk. Experience has shown that to manage that risk, a transparent communications process inside and outside the company is important and therefore the program includes funds to finance an extensive communications campaign. It is not anticipated that jobs will have to be cut to obtain private sector participation. Conversations between the Bank and the company indicate that private participation in the areas proposed is supported by company management.
- 5.6 No major risks are envisaged for private participation in the commercial area, since the company has already experimented with this arrangement. Conversations were held with employees in the commercial area about co-participation in managing that area, which they have accepted as an interesting challenge regarding achievements to date. The proposed execution indicator will generate healthy competition between the two groups.

## **C. Socioeconomic feasibility**

- 5.7 The aspects evaluated were: (i) balance between supply and demand; and (ii) benefit-cost analysis of the minimum-cost solution. The baseline data for the analysis, the estimated econometric models, projections of demand and population growth and the results of running the models can be found in the files of RE3.

### **1. Potable water component**

- 5.8 Two projects were analyzed—Los Pinos and Calderón—costing a total of US\$15.5 million. The other projects to be included in the program will be evaluated using the same methodology. It is based on the public works simulation model, SIMOP, developed by the Bank.
- 5.9 *Demand.* The population, the number of existing connections provided by EMAAP-Q and the projections made in Quito's master plan were used to estimate demand. The demand curve established in the master plan, whose price elasticity is -0.29, was also used.
- 5.10 *Supply.* Supply without the project was determined. The zones in which service will be provided currently have systems with restricted capacity.
- 5.11 *Analysis.* A benefit-cost analysis was performed at July 2001 prices, using shadow prices determined by the Banco del Estado de Ecuador. The costs included were incremental investment, operating and maintenance costs. A cost was included per cubic meter of intake and conveyance to reflect the long-term marginal cost, which is US\$0.17 million. The increase in consumption owing to the end of rationing was considered a benefit. The projects are feasible, with internal rates of economic return between 20 percent and 35 percent.
- 5.12 An analysis of sensitivity to cost and to price elasticity of demand was performed, keeping in mind that the models used were estimated prior to the devaluation. The analysis indicates that the feasibility results for the potable water projects are robust.

### **2. Sewer works component**

- 5.13 Three projects worth US\$4.8 million were evaluated – El Arenal, La Josefina, and Cristo Rey. Two of the projects, costing US\$3.4 million, were feasible. The other projects to be included in the program will be evaluated using the same methodology.
- 5.14 *Demand.* Demand for the combined sewer program stems from the fact that there are an appreciable number of families with water but not sewer service. According to the master plan, the sewer program will extend the system to 400,000 people, with 66,000 connections, by about the year 2025.

- 5.15 *Benefits.* The neighborhoods that will benefit from the sewer systems already have water service. The current system of disposing of sewage is latrines and septic tanks, with some houses dumping sewage directly into the streets. The 'gray' water from the individual sewage disposal systems runs off onto public streets, adversely affecting the environment and the health of residents. Rain water is also channeled along the streets, creating traffic problems on account of heavy rainfall with a short return period of four months.
- 5.16 Public and private benefits will ensue from the construction of sewers and storm drains and disposal systems. The private benefit is the increase in well-being owing to the improved environment in each house and better health. The public benefits are the improvement and preservation of the environment in the project area and the reduction in traffic congestion during heavy rains.
- 5.17 The direct benefits of the system were estimated using the method of contingent valuation based on an estimate of willingness to pay (WTP) for the services. A representative survey (500 observations) calling for yes/no answers was taken in the neighborhoods that will benefit from the works and was used to prepare the econometric model. WTP averaged US\$11.4 per month per family. The value of WTP for each of the observations was limited to 5 percent of family income, since higher values would be unrealistic.
- 5.18 *Costs.* The costs include investment and operating and maintenance costs. To convert market prices to economic prices the components were broken down and shadow prices were applied.
- 5.19 *Analysis.* The feasible projects have an IRR between 13 percent and 20 percent. The Cristo Rey project will not be financed owing to its low rate of return, which is mainly due to the low occupation density in the zone and the low WTP. An analysis of sensitivity to cost and WTP was performed for the feasible projects. The analysis found that the La Josefina project has a high probability of being unfeasible. It is, therefore, recommended that the value awarded be revised during the project bidding or that the project be postponed for three years.

### **3. Slope protection component**

- 5.20 The project will prevent damage caused by floods, high water and mudslides, with a 50-year return period or less, and will reduce the damages caused by events with a longer return period. The El Tejar ravine was used as the program sample. Benefits were quantified for the following: (i) damage to fixed assets; (ii) damage to personal property and vehicles; (iii) damage caused by alterations of urban traffic; and (iv) damage to drains and the cost of cleaning and repairing roads. The 50-year return period was selected by maximizing the net benefits for projects with return periods of 10, 25, 50 and 100 years.

- 5.21 The analysis did not include the savings in costs from time lost waiting in traffic since the floods last for a relatively short time and many of the activities can easily be rescheduled with no significant economic loss. Although lives have been lost in the past and the project may have a favorable impact in this regard, the information available is insufficient to associate the loss of life with the magnitude of hydrological events. It should be noted that not including these potential benefits is an additional security factor in the economic evaluation.
- 5.22 The costs considered were the incremental investment costs and operating and maintenance costs of flood control. The market costs were converted into economic costs using shadow prices determined by the Banco del Estado de Ecuador. The net present value of economic benefits of US\$1.83 million indicates that the project will be feasible, with an IRR of 16.6 percent. A sensitivity analysis was performed, which shows that the project would be viable even if the costs increase by 25 percent or the benefits are reduced by 25 percent.

#### D. Cost recovery

- 5.23 EMAAP-Q's rate structure at December 2001 establishes a fixed charge of US\$1.17 for residential water consumption and a rate of US\$0.16/m<sup>3</sup> for the first 30 m<sup>3</sup>, US\$0.22

**Box 5.1**  
EMAAP-Q income  
(2001)

Service	Income	Volume billed (Mm <sup>3</sup> )	Average rate 2001 (US\$/m <sup>3</sup> )	Average rate 2002 (US\$/m <sup>3</sup> )
Water	25.5	125.7	0.20	0.27
Sewer	7.8	102.1	0.08	0.08
Storm drain	2.0		0.02	0.02
TOTAL	32.5		0.30	0.37

for the next 30 m<sup>3</sup> and US\$0.38 for additional consumption up to 60 m<sup>3</sup>/month. The commercial and industrial rate is US\$0.38/m<sup>3</sup> for all consumption ranges. The sewer rate is 38 percent of the water rate. In addition, 5 percent of the property tax is transferred to the company to cover the operating and maintenance costs of the storm drains. The rates will increase nominally during 2002 by 42.5 percent—the increase will be 30 percent in real terms in the event that inflation during the year is 10 percent. The rate structure produced the income shown in Box 5.1 in 2001.

5.24 Based on financial information for 2001, the total cost (water and sewers) of operating and maintenance per cubic meter billed is US\$0.24 and

**Box 5.2**  
**Cost of services**

Service	O&M cost (US\$/m <sup>3</sup> )	Costs including depreciation (US\$/m <sup>3</sup> )	Long-term marginal cost (US\$/m <sup>3</sup> )
Water	0.16	0.26	0.32
Sewer	0.04	0.06	0.10
Storm drain	0.04	0.09	0.16
TOTAL	0.24	0.41	0.58

when depreciation is included, the figure is US\$0.41. Therefore, the average rate charged for services (water, sewers and storm drains) covers operating and maintenance costs and 35 percent of depreciation. The figures are based on preliminary studies of cost breakdowns (see Box 5.2).

5.25 Although the average rate covers a large part of total costs, the structure presents a subsidy for domestic consumption of under 30 m<sup>3</sup> a month—average rate of US\$0.26/m<sup>3</sup>. There is also cross subsidization of water to the storm sewer. The rate structure and the rates charged for storm sewers are not economically efficient and do not target the poor. To correct these distortions, alternatives to the existing rate scheme will be studied during the first stage of the program with a view to reducing the distortions and targeting the subsidy to low-income consumers and not to low consumption. The study will also determine the cost of storm sewers and the ratio between their cost and the cost of sanitary sewers, to determine a suitable rate.

5.26 The long-term marginal costs to be achieved over 36 months are presented in Box 5.2. The charges for water, sanitary and storm sewers amount to 64 percent of the long-term marginal cost at December 2002. To fully cover that cost, water rates should rise by 19 percent and sewer rates by 13 percent. Transfers from the municipality to EMAAP-Q for storm sewers should increase to about US\$2 million (100 percent of current transfers).

## **E. Impact on low-income groups**

### **1. Ability to pay**

5.27 The beneficiaries' ability to pay for the new water, sanitation and drainage systems was calculated on the basis of the current rate scheme (December 2001). An analysis of capacity to pay found that monthly billing for the service cost less than 5 percent of family income. Information on income distribution was obtained from a representative survey conducted in each of the zones to be served by the subprojects.



- 5.28 Most of the public has the ability to pay the cost of basic consumption, although a percentage will not have that ability, particularly in

**Box 5.3**  
**Income distribution**

Project	Average family income (US\$/month)	Ability to pay (US\$/month)	Monthly bill for basic compensation (20 m <sup>3</sup> /month)	Percentage with the ability to pay
Los Pinos	260	13.0	5.6	12%
Calderón	300	15.0	5.6	9%
La Josefina	271	13.6	5.6	13%
El Arenal	247	12.4	5.6	16%

- El Arenal. However, everyone has the ability to pay for 10 m<sup>3</sup>/month, which is an acceptable level of subsistence consumption (see Box 5.3).
- 5.29 With a rate structure based on the long-term marginal cost, monthly billing would be US\$8.4 million for water and sanitary sewers, and 23.5 percent of the population in the zones where projects would be built would not have the ability to pay for total basic consumption. The subsidy fund would cover an average of US\$2.80 per bill. Extending this analysis to all EMAAP-Q users, 25 percent would not have the ability to pay, and since there are currently 250,000 clients, 62,500 would require subsidies, worth US\$2.1 million a year.

## **2. Impact on low-income groups**

- 5.30 Based on the projects analyzed, this program qualifies as a poverty-targeted investment. Using the Bank's poverty line for Ecuador, which was US\$35.2 per capita per month at December 2001, 51 percent of beneficiaries are in the low-income category.

### **F. Financial feasibility**

- 5.31 The feasibility analysis presented below requires the company and the municipality to adopt the following measures, which must be in effect as of January 2004: (i) establish the rate for water and sewer services based on the long-term marginal cost; (ii) eliminate billing by category and consumption range; and (iii) establish a fund to subsidize consumption and infrastructure for low-income users. **Implementation of these measures will be a contractual condition during execution.**
- 5.32 As a result of the measures in question, EMAAP-Q and the municipality of Quito will be in a position to cover the local contribution during the project. EMAAP-Q's sources of operating income permit it to cover all its operating and maintenance costs, including depreciation, and debt service on all its liabilities. For its part, the municipality is in a position to pay the proportional part of the loan for the environmental sanitation component.

# 1. EMAAP

## a. Income statement

- 5.33 **Operating income.** The company's operating income shows a significant increase during the first three years of the projection. In the first two years it grows as a result of the increase in the number of connections, particularly those in the Mica-Sur project (25,000 water connections and 12,000 sewer connections). The effect of the rise in rates during 2002 and 2003 is largely offset by low average residential consumption. Average residential consumption will fall during 2002 from 28.7 m<sup>3</sup>/month to 24.4 m<sup>3</sup>/month, and in 2003 to 21.9 m<sup>3</sup>/month.
- 5.34 The company agreed with the Bank to modify its rate structure in the third year of the projection. It eliminates consumption by range and category, replacing it with a single rate equivalent to the long-term marginal cost, i.e. water at US\$0.3/m<sup>3</sup> and sewer service at 85 percent of the water rate. The company will present a plan to implement the change in rates to the Bank. The change will increase the company's income by 18.2 percent. Subsequently, its income will increase at an average of 3.9 percent (see Table 5.1).

**Table 5.1**  
Statement of profits and losses  
(in US\$ thousands)

	Historical	Projections					
	2001	2002	2003	2004	2005	2006	2011
Water sales	25,547	33,036	38,225	39,152	40,729	42,430	52,192
Sewer service billings	7,976	7,180	8,010	17,402	17,985	18,651	23,021
Connections	3,293	3,906	2,841	2,140	2,140	2,140	2,300
Sales of electricity	4,055	4,210	4,304	4,448	4,577	4,721	4,858
Property tax	2,004	2,054	2,260	2,599	2,664	2,730	3,089
<b>Gross income</b>	<b>42,874</b>	<b>50,387</b>	<b>55,639</b>	<b>65,740</b>	<b>68,094</b>	<b>70,671</b>	<b>85,460</b>
Uncollectables		(504)	(556)	(657)	(681)	(707)	(855)
<b>Net income</b>	<b>42,874</b>	<b>49,883</b>	<b>55,083</b>	<b>65,083</b>	<b>67,413</b>	<b>69,965</b>	<b>84,605</b>
Growth %	62.2%	16.3%	10.4%	18.2%	3.6%	3.8%	3.9%
Labor	13,899	17,722	18,528	19,350	20,208	20,921	24,884
Business costs	5,495	5,770	6,000	6,180	6,304	6,430	7,099
Materials	5,205	6,312	6,362	6,536	6,740	6,937	7,880
Administrative costs	5,421	5,638	5,807	5,981	6,101	6,162	6,476
<b>Operating and maintenance costs</b>	<b>30,020</b>	<b>35,441</b>	<b>36,697</b>	<b>38,047</b>	<b>39,352</b>	<b>40,450</b>	<b>46,339</b>
Growth %	53.78%	18.06%	3.54%	3.68%	3.43%	2.79%	2.78%
<b>EBITDA</b>	<b>12,854</b>	<b>14,442</b>	<b>18,385</b>	<b>27,036</b>	<b>28,061</b>	<b>29,514</b>	<b>38,267</b>
EBITDA margin	30.0%	29.0%	33.4%	41.5%	41.6%	42.2%	45.2%
Depreciation*	(21,351)	(12,487)	(15,659)	(16,012)	(16,584)	(17,086)	(19,881)
<b>EBIT</b>	<b>(8,497)</b>	<b>1,955</b>	<b>2,726</b>	<b>11,024</b>	<b>11,478</b>	<b>12,428</b>	<b>18,386</b>
Other income (expenditures)	1,395	1,190	1,293	1,241	1,267	1,254	1,259
Interests and fees	(810)	(5,423)	(9,918)	(9,467)	(9,144)	(11,942)	(13,968)
<b>Profit before taxes/transfers</b>	<b>(7,911)</b>	<b>(2,279)</b>	<b>(5,899)</b>	<b>2,798</b>	<b>3,601</b>	<b>1,741</b>	<b>5,676</b>
Water law tax	15,888	12,823	11,541	10,387	10,465	10,543	10,945
Fund contributions			(3,462)	(10,387)	(10,465)	(10,543)	(10,945)
<b>Profit (loss) for the year</b>	<b>7,976</b>	<b>10,545</b>	<b>2,180</b>	<b>2,798</b>	<b>3,601</b>	<b>1,741</b>	<b>5,676</b>

EBITDA: earnings before interest, taxes, depreciation and amortization

EBIT: earnings before interest, taxes and other

\* Adjusted depreciation

- 5.35 **Operating and maintenance costs.** The company's O&M costs grew by 18 percent during 2002, with labor and materials contributing most to that growth. The central government ordered a wage increase of up to 25 percent for the first half and it is expected that the increase to be ordered for the second half will be approximately 10 percent. The cost of materials will increase as a result of O&M for the Mica-Sur and Pichincha slopes projects. Subsequently, these costs will grow at an average annual rate of 3 percent.
- 5.36 **EBITDA and EBIT operating margin.** The projected operating profit margin is optimum and permits the company to easily cover its O&M costs and depreciation. In the first year of the projection (2002) the margin drops as a result of the increase in O&M costs. In 2003, the operating margin will grow and between 2002-2006, it rises from US\$14 million to US\$29 million.
- 5.37 **Financial interest.** Execution of the Bank-financed programs 823/OC-EC and 935/OC-EC will end in mid-2002, which means that interest on the long-term debt will rise substantially, from US\$810,000 in 2001 to US\$5.4 million in 2002 and US\$9.9 million in 2003.
- 5.38 **Taxes and transfers.** Tax income from the Water Tax is an important source of revenues for EMAAP-Q. It rose from US\$9.7 million in 2000 to US\$15.8 million in 2001. It is projected that revenues from the tax will fall to an average of US\$11 million. After the change in rate structure (2004), these funds will be transferred to the fund to subsidize low-income consumers and infrastructure.

## b. Cash flow

**Table 5.2**  
Cash flow statement  
(in US\$ thousands)

	Historical	Projections						
	2001	2002	2003	2004	2005	2006	...	2011
+ Operatings results	(8,497)	1,955	2,726	11,024	11,478	12,428		39,611
+ Depreciation and amortization	21,351	12,487	15,659	16,012	16,584	17,086		77,828
+/- Other income/expenditures	1,395	1,190	1,293	1,241	1,267	1,254		6,245
<b>Internally generated funds</b>	<b>14,249</b>	<b>15,632</b>	<b>19,678</b>	<b>28,277</b>	<b>29,328</b>	<b>30,768</b>		<b>123,683</b>
Debt financing obtained	15,042	21,423	12,500	12,500	12,510	13,980		72,914
Water Law tax	15,888	12,823	11,541	10,387	10,465	10,543		55,760
Municipal contributions	7,970	375	938	938	750	571		3,571
Working capital	(5,142)	(2,729)	(2,582)	1,140	419	1,387		(2,365)
<b>Externally generated funds</b>	<b>33,757</b>	<b>31,893</b>	<b>22,397</b>	<b>24,964</b>	<b>24,144</b>	<b>26,481</b>		<b>129,879</b>
<b>Total sources</b>	<b>48,006</b>	<b>47,524</b>	<b>42,075</b>	<b>53,242</b>	<b>53,472</b>	<b>57,250</b>		<b>253,563</b>
Debt financing repayment	1,969	4,546	7,172	7,172	7,172	9,077		35,140
Interest and fees	810	5,423	9,918	9,467	9,144	11,942		45,894
<b>Debt service</b>	<b>2,779</b>	<b>9,970</b>	<b>17,090</b>	<b>16,639</b>	<b>16,316</b>	<b>21,019</b>		<b>81,034</b>
Water		20,441	7,858	14,070	13,822	17,182		73,373
Sewer works		14,732	9,814	14,492	11,281	10,778		61,096
<b>Capital investments</b>	<b>48,662</b>	<b>35,172</b>	<b>17,672</b>	<b>28,562</b>	<b>25,103</b>	<b>27,960</b>		<b>134,469</b>
Fund contribution	-	-	3,462	10,387	10,465	10,543		34,858
<b>Other applications</b>	<b>-</b>	<b>-</b>	<b>3,462</b>	<b>10,387</b>	<b>10,465</b>	<b>10,543</b>		<b>34,858</b>
<b>Total applications</b>	<b>51,441</b>	<b>45,142</b>	<b>38,224</b>	<b>55,588</b>	<b>51,884</b>	<b>59,523</b>		<b>250,361</b>
Year's cash flow	(3,435)	2,382	3,851	(2,346)	1,588	(2,273)		3,202
<b>Balance at the end of the year</b>	<b>4,305</b>	<b>6,687</b>	<b>10,538</b>	<b>8,192</b>	<b>9,780</b>	<b>7,507</b>		<b>7,507</b>

5.39 The above statement clearly indicates that EMAAP-Q will have no problems with cash flow and projections show that it will remain quite solvent, with an average cash balance of US\$8.3 million over the next 10 years. The company's cash flow statement is given in Table 5.2.

5.40 **Internally and externally generated resources.** Funds to be obtained by the company over the next five years amount to US\$253.5 million. Internally-generated funds of US\$123.7 million account for 49 percent. Externally-generated funds of US\$129.8 million are mainly financed by the IDB (US\$72.9 million), with other income coming from the Water and Sports Act (US\$55.7 million) and other resources (US\$1.3 million).

## 5.41 Debt and investment coverage.

The funds generated internally by EMAAP-Q have an adequate

**Box 5.4**  
Debt coverage  
(in US\$ thousands)

	Historical	Projections						
	2001	2002	2003	2004	2005	2006	...	Total
+ Operating results	(8,497)	1,955	2,726	11,024	11,478	12,428		39,611
+ Depreciation and amortization	21,351	12,487	15,659	16,012	16,584	17,086		77,828
+/- Other income/expenditures	1,395	1,190	1,293	1,241	1,267	1,254		6,245
<b>Internally-generated funds</b>	<b>14,249</b>	<b>15,632</b>	<b>19,678</b>	<b>28,277</b>	<b>29,328</b>	<b>30,768</b>		<b>123,683</b>
Interest and fees	810	5,423	9,918	9,467	9,144	11,942		45,894
Long-term obligations	1,969	4,546	7,172	7,172	7,172	9,077		35,140
<b>Debt service</b>	<b>2,779</b>	<b>9,970</b>	<b>17,090</b>	<b>16,639</b>	<b>16,316</b>	<b>21,019</b>		<b>81,034</b>
<b>Coverage index</b>	<b>5.13</b>	<b>1.57</b>	<b>1.15</b>	<b>1.70</b>	<b>1.80</b>	<b>1.46</b>		<b>1.53</b>

debt coverage index, which averages 1.53. The company's average cash balance is US\$8.5 million and the current assets to current liabilities ratio is above 2.5:1. Net

internally-generated funds (internally generated funds less debt service) over the next five years cover 31.7 percent of investments (see Box 5.4).

- 5.42 The borrower and the MDMQ will be required to take such measures as are appropriate that are acceptable to the Bank to ensure that the rates for water and sewer services produce, as a minimum, sufficient income to cover all administration, operating and maintenance costs and depreciation. If that does not generate sufficient income to service in a timely manner all the borrower's obligations and to help finance its expansion program, the borrower and the MDMQ shall take such steps as are necessary, which may include raising rates, to obtain the additional funds required for that purpose. **Taking steps to ensure that rates comply with the aforesaid conditions will be a contractual condition.**
- 5.43 Since the Bank is the creditor of more than 90 percent of EMAAP-Q's long-term liabilities, it is recommended that the prospective loan contract include a clause stipulating that EMAAP **will be required to maintain a debt coverage ratio of more than 1.2.**
- 5.44 **Investment program.** The company's investment program over the next five years requires funds equivalent to US\$134.4 million—US\$73.4 million for water and US\$61 million for sewers. Financing of the investment program includes net internally-generated funds (US\$42.6 million), IDB loans (US\$72.9 million) and the municipal contribution and other sources of funding (US\$18.9 million). More than 50 percent of the investment program over the next five years will come from IDB resources.
- 5.45 **Contributions to the fund.** The company will receive funds from transfers from the Water Tax for a total of US\$55.7 million which, as mentioned earlier, will be fully transferred to the fund for subsidies and infrastructure starting in 2004.

### **c. Balance sheet**

- 5.46 The projected balance sheet shows adequate liquidity and debt indexes. The company's long-term liabilities as compared to assets increase during the projection as a result of the additional borrowing represented by the proposed loan and the restatement of company assets.
- 5.47 Accounts collectable grow as a function of operating income. Collection efficiency increases, on the basis of the performance indicators, by 87 percent during the first two years of the projection and by 90 percent thereafter. The projected balance of accounts collectable will be on average 65 days, which is considered acceptable since the end of the year balances include a large part of December billings (see Table 5.3).

**Table 5.3**  
**Balance sheet**  
(in US\$ thousands)

		Historical	Projections					
		2001	2002	2003	2004	2005	2006 ...	2011
<b>Assets</b>	Cash and bank accounts	4,305	6,687	10,538	8,192	9,780	7,507	6,805
	Current assets	34,140	38,871	41,842	42,834	44,739	45,299	49,009
	Net fixed assets	581,976	478,896	480,909	493,458	501,978	512,852	566,757
	<b>Total assets</b>	<b>620,421</b>	<b>524,454</b>	<b>533,288</b>	<b>544,484</b>	<b>556,497</b>	<b>565,659</b>	<b>622,571</b>
<b>Liabilities</b>	Current	20,677	22,305	19,694	18,826	20,055	20,501	25,062
	Long-term	178,631	195,882	204,209	212,537	218,970	225,373	255,083
	Net worth	421,113	306,268	309,385	313,121	317,472	319,784	342,426
	<b>Total liabilities and net worth</b>	<b>620,421</b>	<b>524,454</b>	<b>533,288</b>	<b>544,484</b>	<b>556,497</b>	<b>565,659</b>	<b>622,571</b>
<b>Ratios</b>	Liquidity	1.86	2.04	2.66	2.71	2.72	2.58	2.23
	Long-term liabilities/assets	28.8%	37.3%	38.3%	39.0%	39.3%	39.8%	41.0%
	Long-term liabilities/net worth	17.2%	23.6%	24.2%	24.8%	25.1%	25.5%	26.4%

## 2. The municipality

5.48 The financial projections for the next four years, prepared on the basis of information provided by the municipality, indicate that current savings will hold steady at about US\$25 million a year and that income for capital investments will increase significantly during the next three years.

5.49 The increase in capital income will be supported by the country's government through a transfer of US\$71 million—with CAF providing US\$50 million and the government US\$21 million. Agreements have been reached with the central government whereby it will transfer funds for works to the municipality in the amount of US\$47 million during 2002.

5.50 As can be seen, the municipality has the financial capacity to make the local counterpart contribution of US\$3 million and repay the debt for the slope stabilization

**Box 5.5**  
**Budget performance**  
(in US\$ thousands)

	Historical	Projected			
	2001	2002	2003	2004	2005
Current income	59,304	60,872	65,421	67,415	69,470
Current expenditures	29,968	35,508	38,839	41,321	44,015
<b>Current savings</b>	<b>29,336</b>	<b>25,364</b>	<b>26,582</b>	<b>26,094</b>	<b>25,455</b>
Capital income	41,520	75,500	80,685	83,906	43,163
<b>Available for capital expendit.</b>	<b>70,856</b>	<b>100,864</b>	<b>107,267</b>	<b>110,000</b>	<b>68,618</b>
Capital expenditures	65,437	100,864	107,267	110,000	68,618
<b>Surplus (deficit)</b>	<b>5,419</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>

component of this operation of US\$12 million (21 payments of US\$571,450/year) particularly since the municipality's average current savings are over US\$25 million (see Box 5.5).

### **3. Conclusions**

#### **a. EMAAP-Q**

- 5.51 The projections indicate that the company will have the capacity to finance its share of the local contribution and service all its debts. The surplus funds generated internally plus the funds from fiscal transfers will permit it to: (i) cover the local contribution; (ii) cover its working capital requirements; and (iii) finance part of its investments.

#### **b. The Municipality of Quito**

- 5.52 The projections show that the municipality will have no difficulty in providing the local counterpart on time. Considering the size of the debt service after the works are completed and the municipality's income and savings levels, it will have the capacity to meet this commitment.

### **G. Environmental and social feasibility**

- 5.53 The operation's environmental and social feasibility will be ensured through the following actions: (i) inclusion of environmental technical specifications in the construction contracts and the contracts for operation and maintenance of the works; (ii) establishment of a direct subsidy for water demand for the low-income population; (iii) development of complementary programs and projects to include the public in managing the ravines—management of green areas, creation of community microenterprises to collect trash, communications and training plan to promote citizen participation; and (iv) resettlement of 54 families living at risk of extreme natural events. A preliminary resettlement plan, which will be completed during the program, is available in the files of RE3.
- 5.54 The operation has resources to mitigate the impact caused by the works and to undertake the complementary programs and projects. These programs and projects—including a breakdown of activities, timetables, costs and monitoring plans for the projects in the sample—are described in the environmental management plan.
- 5.55 The funds to mitigate the environmental and social impacts and to carry out complementary programs and projects for the projects in the sample include: (i) mitigation of impact during construction of the works planed for the El Tejar ravine (US\$50,000); (ii) communications program, community actions, training and citizen participation in the El Tejar ravine (US\$160,000); (iii) creation of community microenterprises to collect trash in the El Tejar ravine (US\$80,000); (iv) resettlement of 54 families living in the El Tejar ravine (US\$680,000); (v) management of urban and rural green areas in the El Tejar ravine (US\$710,000); (vi) mitigation of impact during construction of the Los Pinos,

Arenal de Calderón and La Josefina projects (US\$54,000); and (vii) implementation of the monitoring plan (US\$90,000).

## **H. Benefits**

- 5.56 The program is intended to reduce the risks of flooding and mudslides caused by torrential rainfall in the center and southern parts of the city, which will benefit the public in those areas, particularly people living in risk zones, who are mainly from low income groups.
- 5.57 The program will also extend the coverage of water and sewer services to people in Quito who currently do not have them, which will improve the quality of life of that mainly low-income population.

## **I. Risks and mitigating measures**

- 5.58 **Risk.** There is a risk that basing the rates charged by EMAAP-Q for water and sewer services on the long-term marginal cost will encounter problems in implementation for political reasons. **Mitigating measure.** This risk is minimized by the study to set those costs on the basis of technical criteria, the establishment of a subsidy fund, and the incentive of a second stage of the program, which will not be considered by the Bank unless the rate system is implemented and operational.
- 5.59 **Risk.** Another risk is that there may be no interest by the private sector in bidding on concessions to provide the services in the EPs or in managing the commercial area. **Mitigating measure.** In such a situation, the company will have to rethink its long-term investment strategy.
- 5.60 **Risk.** There is the possibility that the national regulatory framework may not be implemented in the short term owing to the conflict between municipal decentralization and autonomy and the central government. **Mitigating measure.** To mitigate this risk, it has been agreed that a temporary regulatory scheme—management and rate audits—will be implemented on the municipal level.



## METROPOLITAN QUITO ENVIRONMENTAL SANITATION PROGRAM - EC-0200

### TENTATIVE BID TIMETABLE

MAIN PROGRAM PROCUREMENTS	LOTS	FINANCING		METHOD	COST (US\$ thousands)	IDB NOTIFICATION (semester/year)
		IDB	LOCAL			
<b>A. Civil works</b>						
1. Potable water – Calderón	1	83	17	ICB	13,300	II/02
2. Sewers - El Arenal de Calderón	1	83	17	ICB	4,100	II/02
3. Sewers - La Josefina	1	83	17	LCB	1,200	II/02
4. Potable water and sewers - Los Pinos	1	83	17	LCB	2,400	I/03
5. Flood control - El Tejar ravine	1	83	17	ICB	6,300	II/03
6. Flood control – Jerusalén ravine	1	83	17	ICB	6,700	I/04
<b>B. Goods</b>						
1. Software and hardware for the georeferenced system	1	39	61	LCB	150	I/03
2. Materials and equipment for leak detection in the distribution system	1	39	61	LCB	100	I/03
<b>C. Consulting services</b>						
1. Marginal costs, rates, slope maintenance and storm drains	1	39	61	ICB	200	II/02
2. Direct subsidies for low-income consumers	1	39	61	LCB	50	II/02
3. Expansion of the hydrometeorological network	1	39	61	ICB	300	II/02
4. Campaign on private sector participation	1	100	0	LCB	100	I/02
5. Commercial management (50%) and outsourcing of commercial management (50%)	1	100	0	ICB	400	II/02
6. General land development plan of the DMQ.	1	66	34	ICB	300	II/02
7. Final designs for the El Tejar ravine, including a land use plan – EIA	1	66	34	LCB	195	II/02
8. Feasibility and final designs for the Jerusalén ravine, including a land use plan – EIA	1	66	34	ICB	210	II/02
9. Feasibility studies for the Navarro ravine, including a land use plan	1	66	34	LCB	100	II/02
10. Final designs for the Navarro ravine, including a land use plan	1	66	34	LCB	110	II/03
11. Feasibility studies for the Calvario ravine to Raya Sur	1	66	34	ICB	200	I/03
12. Final designs for the Calvario ravine to Raya Sur	1	66	34	ICB	260	I/04
13. Feasibility studies for Atucucho and stage two of Mica	1	66	34	LCB	115	II/02
14. Final designs for Atucucho and expansion of the El Troje plant	1	66	34	LCB	150	II/03
15. Feasibility studies for the Cumbayá, Tumbaco, Puembo, and Chillos sectors	1	66	34	LCB	60	I/03
16. Final designs for the Cumbayá, Tumbaco, Puembo and Chillos sectors	1	66	34	LCB	100	I/04
17. Determination of the value of EMAAP-Q’s fixed assets	1	66	34	ICB	200	II/02

ICB international competitive bidding LCB local competitive bidding

## METROPOLITAN QUITO ENVIRONMENTAL SANITATION PROGRAM (EC-0200)

### LOGICAL FRAMEWORK

NARRATIVE SUMMARY	INDICATORS <sup>1</sup>	MEANS OF VERIFICATION	MAIN ASSUMPTIONS
<b>A. GOAL</b>			
1. To help improve the quality of life of the residents of the MDMQ by permitting settlement in areas where the risk of hydrometeorological events has been controlled and basic water and sewer services provided.	1.1 Losses owing to damage to public and private property caused by hydrometeorological events with a recurrence interval of less than 50 years eliminated.	1.1 Civil Defense	1.1 The economy continues to grow and the municipality maintains or increases its current levels of revenue. EMAAP-Q's independence is maintained. Municipal priorities do not change.
	1.2 Number of cases of water-borne diseases reduced.	1.2 Department of Health	1.2 Idem 1.1
<b>B. PURPOSE</b>			
1. To reduce flooding, mudslides, and landslides and expand water and sewer services in priority areas.	1.1 Elimination of damage to public and private infrastructure caused by floods and mudslides in the project zones within four years for hydrometeorological events with a recurrence interval of less than 50 years.	1.1 Civil Defense	1.1 EMAAP-Q and the municipality maintain the program's priority.
	1.2 Increase in consumption from 8 m <sup>3</sup> a 25 m <sup>3</sup> a month per family for the 5,200 new water connections.	1.2 Borrower's report	1.2 Idem 1.1
	1.3 Elimination of water rationing for 110,000 people (20,000 connections) living in Calderón. Monthly family consumption rises from an average of 14 m <sup>3</sup> to 25 m <sup>3</sup> .	1.3 Community surveys	1.3 Idem 1.1

<sup>1</sup> Times are counted after the conditions precedent to the first disbursement are complied with.

NARRATIVE SUMMARY	INDICATORS <sup>1</sup>	MEANS OF VERIFICATION	MAIN ASSUMPTIONS
	1.4 Improvement in the quality of life since the sewer system will prevent dumping of sewage into public streets and offensive odors.	1.4 Community surveys	1.4 Idem 1.1
2. To build institutional capacity for efficient management of the services provided by EMAAP-Q.	2.1 Operating margin of 30% in the baseline to 40% in year four.	2.1 Borrower's and auditors annual reports. Company's financial statements.	2.1 EMAAP-Q continues to be independent from the municipality.
	2.2 Collection efficiency from 87% in the baseline to 90% in year four.	2.2 Idem 2.1	2.2 Idem 2.1
	2.3 Employees per 100 water connections from six in the baseline to five in year four.	2.3 Idem 2.1	2.3 Idem 2.1
	2.4 Residential metering from 70% in the baseline to 85% in year four.	2.4 Idem 2.1	2.4 Idem 2.1
	2.5 Meters in operation from 80% in the baseline to 85% in year four.	2.5 Idem 2.1	2.5 Idem 2.1
	2.6 Reduction in the time taken to attend to user complaints.	2.6 Annual reports by the borrower	2.6 Idem 2.1
	2.7 Prevention of rate increases owing to company inefficiency.	2.7 Idem 2.1	2.7 Idem 2.1
C. COMPONENTS			
1. Slope management and flood control  Drainage and watershed and slope protection operating satisfactorily and environmental and community interventions consolidated.	1.1 The macrodrainage systems in two ravines—El Tejar and Jerusalén—operate adequately within four years for hydrometeorological events with a recurrence interval of less than 50 years.	1.1 Hydrology Department, EMAAP-Q, INAMHI. 9-1-1, Civil Defense, Firefighters.	1.1 Adequate solid waste collection and disposal. The conditions of the agreement between EMAAP-Q, the municipality and community organizations are complied with.
2. Water and sewer works  Sewer and water systems operating efficiently and providing satisfactory service for customers in the Calderón, La Josefina and Los Pinos zones.	1.1 Within four years, two water systems with at least 23,000 residential connections improved, with average consumption of at least 25 m <sup>3</sup> a month, operating up to national standards and complaints not exceeding 10% of all customers a year.	1.1 Commercial management: cadastre and metering and billing offices. MIDUVI: Subsecretariat of Environmental Sanitation.	

NARRATIVE SUMMARY	INDICATORS <sup>1</sup>	MEANS OF VERIFICATION	MAIN ASSUMPTIONS
	1.2 Within four years, three sewer systems with at least 4,500 residential connections for at least 75% of potential connections operating up to national standards and complaints not exceeding 15% of all customers a year.	1.2 Idem 1.1	1.2 Users connect to the sewer system in accordance with the municipal ordinance.
<b>3. Institutional strengthening</b>  EMAAP-Q invests, operates, maintains and efficiently administers the water and sewer systems in the MDMQ under a provisional regulatory scheme. The private sector participates partially in the delivery of services. The municipality is trained to monitor and apply land use regulations in the El Tejar and Jerusalén ravines.	3.1 Annual management and rate audits starting in year one conducted prior to a review of the rate proposals.  3.2 Master plan updated with data from 2001 and projected to 2022, within 18 months.  3.3 In six months after the master plan is approved, the rate structure in function of long-term marginal costs is updated with the master plan.  3.4 In 48 months, services conceded in the eastern parishes of the MDMQ.  3.5 In 12 months, a training and technical assistance plan is designed and implemented for the campaign, application and control of the rules for land use and occupation.	3.1 Annual reports on the management, rate and financial audits. Annual rate proposals. Final reports on studies to update the master plan and long-term marginal costs.  3.2 Idem 3.1  3.3 Idem 3.1  3.4 Concession contract  3.5 Idem 3.1	3.1 The private sector is interested in the concession. Political decision by the municipal authorities to support the training and technical assistance process. Political decision by the authorities involved in the concession process.  3.2 Idem 3.1  3.3 Idem 3.1  3.4 Inhabitants of the zone accept the concession to the private sector.  3.5 EMAAP-Q unions agree to the concession.

NARRATIVE SUMMARY	INDICATORS <sup>1</sup>	MEANS OF VERIFICATION	MAIN ASSUMPTIONS
D. ACTIVITIES <sup>2</sup>			
<b>1. Slope management and flood control</b> 1a. Water regulation, slope stabilization, and repair and expansion of storm sewers. 1b. Management and conservation of urban and rural green areas. 1c. Community development. 1d. Family resettlement.			
<b>2. Water and sewer works</b> 2a. Potable water works: <ul style="list-style-type: none"> <li>• Calderón</li> <li>• Los Pinos</li> </ul> 2b. Sewer works: <ul style="list-style-type: none"> <li>• Calderón</li> <li>• La Josefina</li> <li>• Los Pinos</li> </ul>			
<b>3. Institutional strengthening:</b> <ul style="list-style-type: none"> <li>• Annual audits</li> <li>• Master plan</li> <li>• Rate structure</li> <li>• Concession process</li> <li>• Training for MDMQ</li> <li>• Other EMAAP-Q—hydrology, environmental management</li> </ul>			

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<sup>2</sup> The timetables for activities will be determined at the seminar to launch the program.